WHAT VARIABLES FOSTER THE ADOPTION AND IMPLEMENTATION

OF SUSTAINABLE PRACTICES BY LOCAL GOVERNMENTS?

By

John J. Duffy

RECOMMENDED:

Ms. Julie Joly, J.D.

Dr. Chanda Meek

Dr. David Valentine

Dr. Susan Todd, Advisory Committee Chair

Dr. Peter Fix, Chair, Department of Natural Resources Management

APPROVED:

Dr. David Valentine
Director of Academic Programs
School of Natural Resources and Extension

Dr. John Eichelberger
Dean of the Graduate School

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Date

WHAT VARIABLES FOSTER THE ADOPTION AND IMPLEMENTATION OF SUSTAINABLE PRACTICES BY LOCAL GOVERNMENTS?

A

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John J. Duffy, B.A., M.U.P.P.

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Abstract

The importance of local governments in developing sustainable communities and meeting the challenges of climate change was recognized at the 1992 United Nations Conference on Environment and Development. The principle ways that local governments may influence the pursuit of sustainability and the creation of resilient and adaptive communities is their planning responsibilities, building codes, infrastructure investments and economic development efforts. Yet most local governments are not pursuing sustainability nor embarking on efforts to build more resilient communities.

This exploratory study evaluated variables that appeared useful for explaining the pursuit of sustainability and resiliency by local governments. Casting more light on the variables that foster sustainability at the local government level may help more local governments pursue such efforts. The research question that guided the research is*: What variables foster the adoption and implementation of sustainable practices by local governments?* Answering this question provides a foundation for additional research on the results found here and thereby foster sustainability at the local government level.

A multi-case study approach was used as the selected research method. The cases included fourteen small local governments located in Alaska and Oregon, some practicing sustainability and others not. Data were collected through surveys, interviews, government reports and databases as well as archival document analyses.

This exploratory research identified the variable categories of institutional setting, political party affiliation and community well-being as having strong to moderate association with local government pursuit of sustainability. In other words, of the variables studied, these three categories are the most likely to foster sustainability. If these results are confirmed by further studies, then doing what we can to increase these four characteristics would also foster sustainability. The study also suggests that small local governments behave differently than large local governments (populations exceeding 250,000). While additional research is necessary to confirm this study's exploratory findings, it appears that in order for local government pursuit of sustainability to occur, a favorable milieu as described by the variable categories noted above must exist.

Keywords: sustainability, sustainable site, local government

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Chapter 1 Introduction

1.0 Introduction

The research question that guides this study is: *What variables foster the adoption and implementation of sustainable practices by local governments?* The study seeks to understand why some local governments have chosen to use their various powers to pursue sustainability efforts while others have not. It is paramount that local governments get involved in sustainability programs if our nation is to successfully meet the threats of climate change. However, only a modest number of local governments are participating in sustainability efforts. As stewards of the public trust and due to their duties and responsibilities, local governments provide the framework for affecting positive change nationwide.

This study used an interdisciplinary, mixed-methods approach to understand why some local governments pursue sustainability while others do not. Based on an extensive literature search, the study identified six categories of variables, discussed below, that provide a path for understanding the likelihood of local governments pursuing sustainability. Fourteen local governments, six in Alaska and eight in Oregon, were examined to determine the strength of these variable categories in predicting local government pursuit of sustainability. Knowing the variables that foster sustainability at the local government level may allow practitioners and citizens to be aware of, and/or to create, the conditions that allow effective sustainable practices. As more local governments implement sustainable practices, a more widespread and effective response to climate change will result. If significant progress is to be made in meeting climate change challenges as well as enhancing community resilience and adaptation, there is a critical need to identify the traits of local governments and communities in which they are located that foster sustainability.

1.1 Hypothesis and Variables in the Study

The study's dependent, or response, variable is sustainability. The study also evaluated independent, or explanatory, variables within six categories that are believed to explain whether or not a local government pursues sustainability. The six categories are: 1) community context, 2) institutional setting, 3) environmental stressors, 4) political party affiliation, 5) new political culture and 6) community well-being (See Figure 1.1).

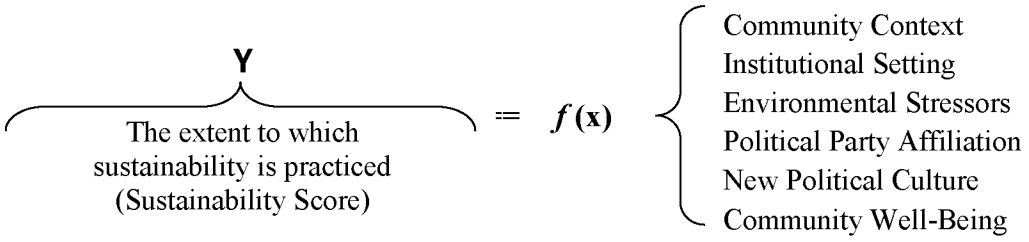


Figure 1.1. Hypothesis: Pursuit of Sustainability is a Function of Six Variable Categories.

The category of community context includes variables describing a community's social-demographic-economic characteristics such as type of household, income, education and occupation. The institutional setting includes variables describing the local government as measured by form of government, debt burden, financial resources, and form of adoption measures. The environmental stressors category includes variables that describe the community's or region's environmental stressors such as drought conditions, experience with extreme events and air and water quality. The political party affiliation category consists of election results for major political offices in the 2008 to 2012 timeframe. New political culture considers a community's openness to new ideas and innovation. Community well-being, the final variable category measures a community's levels of safety, health, income and education. In closing, this study seeks to test the hypothesis that a local government's pursuit of sustainability is a function of: a community with high context and well-being measures, having a local government with strong financial and personnel resources, with experience of natural environmental challenges.

1.2 Literature Review

A literature review was completed on the subject of local government and sustainability. The review consists of sections devoted to the role of local government in sustainability, variables related to local government pursuit of sustainability, and methods employed by previous research.

1.2.1 Role of Local Government

The notion that local governments have an important role to play in sustainability and climate change can be traced to the late 1980s work of the United Nations World Commission on Environment and Development, also known as the Brundtland Commission, that emphasized the role of city governments in achieve sustainability (Portney & Berry, 2010). The United Nations adoption of Local Agenda 21 at Rio de Janerio in 1992 also affirmed the important role of local governments in the area of sustainability (Glass, 2002; Keen, Mahanty & Sauvage, 2006; Mercer & Jotkowitz,

2000; Saha, 2009a). Of the 2,509 actions identified within Agenda 21, approximately two-thirds require the involvement of local authorities (Mercer & Jotkowitz, 2000). The local government involvement sought by Agenda 21 is primarily in the area of land use decision-making; more specifically, better integration of planning in development decisions to affect more sustainable development practices. Glass (2002) explains why local governments have such an important role in sustainability by noting their planning and regulatory powers affecting development in the areas of land use, resource use, and waste management. Saha (2009b) adds that local governments are also more likely to have direct involvement by citizens on proposals than other levels of government and that public sector implementation occurs at the local level. In the United States, it is local government authority in the areas of land use planning and regulation and infrastructure planning and investment that make local government involvement in sustainability so important.

1.2.2 Connecting Land Use Planning, Climate Change and Sustainability

Local government land-use decisions are important because land-use is a major contributor to climate change (Intergovernmental Panel on Climate Change [IPCC], 2000; Pielke, 2005). Land use decisions contribute to climate change through land cover conversions and land use activities. Land cover conversions consist of surface use changes such as cutting forests for agriculture (Turner, Gardner, & O'Neil, 1995; Lambin et al., 2001, Aspinall & Hill, 2008). Land use decisions relate to how we utilize land such as for housing (Lambin, Geist, & Rindfuss, 2006). Land use decisions also direct spatial development such as the location of residential and employment centers which affect transport energy costs related to the movement of people and goods between activity centers. The spatial effects of local land use decisions are significant. In the United States, for example, the transportation sector accounts for 28% of greenhouse gas (GHG) emissions with passenger cars and trucks accounting for 84% of transportation's GHG production (U.S.Department of Transportation, 2006).

Sustainability has long been promoted as a means of addressing climate change (IPCC, 2013; Robèrt, Daly, Hawken, & Holmberg, 1997). Sustainability is a recommended course of action because it seeks to recast our present patterns of development and behaviors in a way that ensures that present actions do not eliminate or degrade opportunities of future generations (Chapin III, Kofanis, & Folke, 2009; IPCC, 2013; United Nations Conference on Environment and Development [UNCED], 1992). The American Planning Association recognized these paths by revising its standards for community comprehensive plans to require recommendations for meeting the challenges of climate change and building community resilience (Godschalk & Anderson, 2012). Previous research also recognizes that local government planning and land-use efforts are particularly

well suited for promoting sustainability (Long, 2009; Outka & Feiock, 2012; Trisolini, 2010). In addition, the leading professional associations of local governments all recognize the role local governments have in achieving sustainability (International City/County Managers Association, 2014; National Association of Counties, 2014; National League of Cities, 2014; U.S. Conference of Mayors, 2014).

1.2.3 Variables Associated with Local Government Sustainability

Previous studies identify over forty-six variables related to local government pursuit of sustainability. More specifically, previous research has shown a positive relationship between local government sustainability efforts and population growth, (Conroy & Iqbal, 2009; Saha, 2009a), age (Saha, 2009a), decennial census population change (Conroy & Iqbal, 2009), education (Portney & Berry, 2010; Saha, 2009a; White & Boswell, 2007), median household income (Conroy & Iqbal, 2009), and a racially homogenous population (Saha, 2009a). One study by Portney (2003) found a negative relationship between manufacturing occupation and local government pursuit of sustainability. An article by Saha (2009b) cites numerous articles which provide insights on variables associated with local government sustainability. Some of variables identified include: committed staff, supportive elected officials, and effective public participation (Clough & Laird, 1997) and tracking a set of sustainability indicators (Krizek & Power, 1996). Other research studies unearthed other variables related to sustainability. White and Boswell (2007) borrow from the literature on local government innovation when identifying variables associated with sustainability actions by local governments in Kansas. The variables identified include: regional diffusion, policy innovation, and a federally mandated program.

The amount and type of public participation within a community and community support are identified as key variables associated with local government sustainability efforts by Jepson (2007), Pini, River and McKenzie (2007), and Portney and Berry (2010). These researchers argue that if a community is active, informed, and supportive of sustainability efforts, it is more likely that its respective local governments will instigate sustainability initiatives. Each of these researchers also identify other variables that play supportive roles such as capacity and commitment (Pini et al., 2007), technology, environment, and organization (Jepson, 2007), and formal adoption efforts by the local governments (Saha, 2009a).

The role of an organization's elected officials and personnel are identified by Johnson and White (2010) as important variables associated with success or failure of local government sustainability efforts. Without support from elected officials, funds are not allocated and sustainability policies are

not adopted. Additionally, without the support of an organization's personnel, sustainability efforts are not implemented with zeal or are done so cautiously.

Broad categories of variables are identified by Budd, Lovrich Jr., Pierce, and Chamberlain (2008) and Saha (2009a) through the development of indices. In a study of urban areas in the United States, Budd et al. (2008) developed an index consisting of historical legacy, social capital, and creative culture. Each index contained cultural profiles; for example, the historical legacy index contained the political cultures of traditionalistic, individualistic and moralistic. Budd et al., identified the moralistic political culture (i.e., an activist government) as a strong indicator of local government progress in the area of sustainability. The index developed by Saha (2009a) considered political, institutional, intergovernmental, and economic variables. Political culture was identified by Saha (2009a) as being an important predictor of city sustainability. The findings that political culture is related to sustainability efforts are important but not surprising. Sustainability is a form of innovation, something new, so it requires a political culture that is open to new approaches. Innovations typically require additional funding sources, so a political culture that is open to new expenditures is also important to new sustainability efforts.

1.2.4 Methods

The literature reflects a variety of research methods in use to study local government sustainability. The methods used include: a synthesis of existing literature, case studies, national and regional sampling, and examination of previous datasets. An article by Saha (2009b) provides a synthesis of the existing literature on local government sustainability. However, the article does not provide data on how the synthesis was conducted. More specifically, information on databases, descriptors, inclusion/exclusion rules, and timeframe, is not provided. Therefore, we do not know how inclusive the article's synthesis truly is.

The studies using the case study approach selected cases through different means. While case study research may focus on a single case, the literature reviewed identified few single case analyses, the majority were multi-case analyses. A variety of criteria were used to select the cases; for example, area and population were used by Johnson and White (2010) and White and Boswell (2007), Budd et al. (2008) used an index to create the sampling frame, and Pini et al. (2007) used a criterion-based technique with natural resource management as the criterion. The use of case studies and the reported sampling techniques appear appropriate in each instance. Other studies used data collected from previous surveys of local governments for their research (Jepson, 2007; Mercer & Jotkowitz, 2000; Saha, 2009a). Almost all of the research reviewed focused on local governments having populations

of 50,000 or more and the majority of the studies considered major urban areas; those with populations exceeding 250,000.

Narratives and diagrams were used to explain results in several of the articles considered (Glass, 2002; Jepson, 2007; Keen, Mahanty, & Sauvage, 2006; Mercer & Jotkowitz, 2000; Pini et al., 2007; Saha, 2009b). Research that did use some form of statistical analyses included: basic descriptive measures (Johnson & White, 2010; White & Boswell, 2007), regression analysis and tests of significance (Jepson, 2007; Portney & Berry, 2010; Saha, 2009a), and regression and correlation analyses, (Budd et al., 2008).

Few studies describe why some cities embrace sustainability efforts while others do not. Research by Jepson (2007) is one of the few attempts to identify the characteristics of local government and conditions of policy related to the adoption of sustainability efforts. However, Jepson nevertheless concludes "that the adoption of sustainable development policies among communities in the US remains essentially inexplicable; no formula of propensity toward sustainability has been revealed." A synthesis of the existing literature by Saha (2009b) also found a lack of information regarding variables fostering local government sustainability. Saha sums up the lack of knowledge in two questions: "Why does sustainable development take centre stage in some cities while remaining off the agenda in others? Are there certain common characteristics and traits that characterize cities that have adopted sustainability initiatives?" These are especially troubling findings since the important role of local governments in the area of sustainability was identified over twenty years ago in Agenda 21.

The literature does not link these categories with one another. Instead, the literature is comprised of studies describing a relationship with one or a few variables within a single category and local government pursuit of sustainability. In other words, a study might report upon how one or a few variables such as population growth, (Conroy & Iqbal, 2009; Saha, 2009a), age (Saha, 2009a), creative class composition (Budd et al., 2008), decennial population change (Conroy & Iqbal, 2009), education (Portney & Berry, 2010; Saha, 2009a; White & Boswell, 2007), or median household income (Conroy & Iqbal, 2009), is related to local government pursuit of sustainability. No study was found that attempted to explain local government pursuit of sustainability as related to different categories, each consisting of several variables.

1.3 Key Terms

Four key terms are fundamental to my research: local government, sustainability, sustainable practice, and sustainable community. These terms are common in everyday conversation but are used very specifically in this research. The following sections describe how I have defined these terms for

use in this research. Supplemental information on two terms, local government and sustainability, is also provided due to the research focus.

1.3.1 Local Government

Surprisingly, most previous research fails to provide a definition of a local government. A common definition is vital because local government is the unit of analysis and different definitions exist. The 90,056 local governments in the United States (U.S.) are of two general categories: general purpose and special purpose (U.S. Census Bureau, 2012a, 2012b). General purpose local governments include cities, towns, townships, counties, and boroughs. Special purpose local governments include school districts and special districts, such as port districts and transit districts. Notwithstanding the Census Bureau's definition, special purpose local governments are not commonly thought of as local governments and do not have similar statutory powers. The US Census Bureau identifies 38,910 general purpose governments and 51,146 special purpose local governments.

This research consisted of a multi-case analysis of fourteen local governments. The multiple cases were analyzed in terms of the level of their pursuit of sustainability as well as the potential variables associated with their pursuit or lack thereof. Of the fourteen cases, six are located in Alaska and eight are located in Oregon. Table 1.1 provides summary information of the cases in the study and Figures 1.2 and 1.3 depict their respective locations.

1.3.2 Local Government Powers, Form and Services

Local governments are political subdivisions of the state; therefore, state statutes and legislation prescribe their powers and authorities. As the cases considered here include local governments located in the states of Alaska and Oregon, a brief overview of each state's framework for local authority is provided.

Alaska statutes define two forms of local government, cities and boroughs, though all are municipal corporations (Alaska State Legislature, 2013). There are also two types of municipal corporations in Alaska: home rule and general law. The powers of a home rule municipality are described in a charter that is ratified by the voters of the community. Home rule power may include any power not prohibited by Alaska state or federal law.

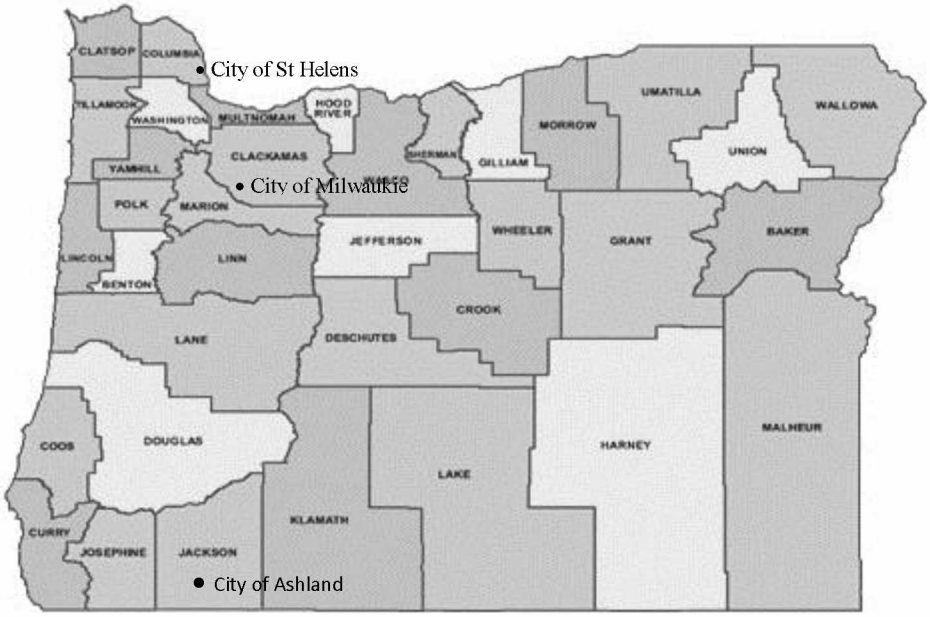
Table 1.1. Alaska and Oregon Local Government Characteristics

Case	Form of Government	Population 2008-2012	Population change 2000 – 2010	Land size (sq.mi.)	Water size (sq.mi.)
Juneau	Home rule, Council-Manager	31,636	1.8%	2,701	539
Sitka	Home rule, Council-Manager	8,909	0.5%	2,870	5,030
Fairbanks	Second class, Council-Mayor	97,523	17.8%	7,338	105
Kenai	Second class, Council – Mayor	55,474	11.5%	16,013	8,741
Ketchikan	Second class Council-Manager	13,525	-4.2%	4,858	1,795
Kodiak	Second class, Council-Manager	13,710	-2.3%	6,550	5,472
Ashland	Council-manager	20,186	2.8%	6.6	0
Milwaukie	Council-manager	20,391	-1.0%	4.8	0
St. Helens	Council-mayor-manager	12,807	28.6%	5.5	1
Clatsop	Home rule, Commissioner-5 –manager	37,608	4.0%	843	180
Columbia	Commissioner-3	49,317	13.3%	687	32
Crook	Commissioner-3 –'county judge' administrator	21,102	9.4%	2,991	8
Hood River	Home rule, Commissioner-5 –manager	22,207	9.5%	533	11
Tillamook	Commissioner-3	25,254	-8.3%	1,125	231
Min		8,909	-8.3%	4.8	0
Max		97,523	28.6%	16,013	8,741
Mean		30,689	6.0%	3,323	1,582
Median		21,655	3.4%	1,913	143
Std Dev		23,638	9.8%	4,380	2,777

Sources: Alaska State Legislature (2013); State of Oregon (2014); U.S. Census Bureau (2000, 2012c).

Alaska county map. Adapted with permission. Copyright 2015 by Digital-topo-maps.com. Retrieved from http://www.digital-topo-maps.com/county-map/alaska.shtml

Figure 1.2. Location of Alaska Local Government Cases



Oregon county map. Adapted with permission. Copyright 2015 by Digital-topo-maps.com. Retrieved from http://www.digital-topo-maps.com/county-map/alaska.shtml

Figure 1.3. Location of Oregon Local Government Cases

The powers of a general law municipality, on the other hand, are prescribed by state law and differ according to the class of general law municipality, first, second or third. Generally speaking, first class municipalities are provided the greatest amount of powers and duties while a third class municipality the least. General law municipalities may add to their powers by obtaining voter approval of the proposed additional power. Alaska also allows for the unification of cities and boroughs as well as the establishment of general law cities within a home rule borough. The governing bodies of Alaska's borough are assemblies and most borough assemblies range in size from seven to eleven. The governing bodies of Alaska cities, on the other hand, are councils and they too range in size from seven to eleven.

In Oregon there are also two types of local government: county and city. Counties were formed early in Oregon's history and acted primarily to implement state functions. Two changes in the legal status of counties greatly modified this relationship (State of Oregon, 2014). The first change occurred in 1958 when counties were granted by the state the ability to achieve home rule status; thereby allowing counties to expand their authority. Another change was made by the state in 1973 which granted all counties the ability to exercise home rule authorities. Because of these changes in state law, counties in Oregon exercise a higher degree of local authority of any county in the nation. Oregon counties are governed by a board of commissioners; most having three, though a smaller number of counties have five. All cities in Oregon are home rule. Oregon cities are governed by councils, typically ranging between five and seven members.

Local governments may also have different governing forms. The most common include: council-mayor, council-manager, commissioner, and commissioner-manager. There are also variants of each governing form, such as strong mayor, weak mayor, or the designation of a 'judge' commissioner (the 'judge acts as the chief administrative officer). These variants allow for different levels of authority between the council or commission and their mayor/manager/administrator counterparts. In the council-mayor, council-manager, and commissioner-administrator structures, the councils and commissioners are responsible for setting policy, adopting legislation and approving tax rates and budgets while the manager or administrator is responsible for implementing the council's and commissioners' actions. In the commissioner form, the commissioners perform both legislative and administrative roles.

All of the cases participating in the study provide the typical suite of local government services. Specifically, each provides planning, zoning, zoning enforcement, elections, public works, tax assessment and parks and recreation. All of the Oregon local governments also provide police services in addition to the typical services. Oregon counties provide the additional services of health assessment and district attorney. In Alaska, all boroughs provide tax assessment services and

education funding in addition to the typical local government services. Few Alaska local governments provide police services as most Alaska communities rely on the Alaska State Troopers. In addition, local governments will perform other functions deemed important by the local community. For instance, the city and borough of Juneau provides hospital and police services, the city and borough of Sitka owns and operates an electrical power generation facility. Others, like Columbia County operate correction facilities such as jails while others provide transportation services such as the Ketchikan Gateway borough's management of a state airport. Lastly, the physical sizes of the Alaska local governments are substantially larger than their Oregon counterparts.

1.3.3 Local Governments and Planning

In the United States, local governments are the principle land use decision-makers. Of interest to this study are the guidelines and requirements for comprehensive planning in the states of Alaska and Oregon. The contrast between these states' planning statutes is stark. The differences in state statutes lead to differences in the planning topics addressed by the respective local governments that in turn affect the local regulatory framework and form of development.

Alaska's planning statutes are minimal. The planning function is placed with the borough. The only state requirement is that the boroughs adopt a comprehensive plan, defined as a compilation of goals and policies guiding the community's physical, social, and economic development (Alaska State Legislature, 2013). Five subject areas may be included: goal statements, land use, community facilities, transportation, and recommendations for implementation. Alaska's state planning statutes also describe implementation methods; these include zoning regulations, permit regulations, and other measures that further the goals of the comprehensive plan.

In Oregon, local governments are also required to have comprehensive plans. Similar to Alaska, the most common implementation measures employed by Oregon's local governments are zoning and land-division ordinances. Oregon's state planning statutes; however, are more comprehensive and directive than Alaska's. In fact, Oregon is one of the two states having the strongest state regulations in the country, the other being Florida. Oregon's planning statutes identify nineteen goals (see Table 1.2) that express the state's policies related to land use (State of Oregon, 2010a).

Table 1.2. Oregon's Goals for Local Comprehensive Plans

1. Citizen Involvement	10. Housing
2. Land Use Planning	11. Public Facilities and Services
3. Agricultural Lands	12. Transportation
4. Forest Lands	13. Energy Conservation
5. Natural Resources, Scenic and Historic Areas, and Open Spaces	14. Urbanization
	15. Willamette River Greenway
6. Air, Water, and Land Resources Quality	16. Estuarine Resources
	17. Coastal Shorelands
7. Areas Subject to Natural Hazards	18. Beaches and Dunes
8. Recreational Needs	19. Ocean Resources
9. Economic Development	

Source: State of Oregon (2010a).

A local government's comprehensive plan must be consistent with these goals. Another difference between the two states' planning statutes is that Oregon revised its planning statutes in 2013 to recommend, though not require, the use of land use planning to achieve sustainable development patterns and manage the effects of climate change (Oregon Legislative Assembly, 2013). Lastly, the State of Oregon, through its Land Conservation and Development Commission, (LCDC) reviews local plans for consistency with the state's planning goals (State of Oregon, 2010a). Upon "acknowledgement" by Oregon's LCDC the locally developed plan becomes the controlling land use document for the local government. No similar state review and acknowledgement process exists in Alaska.

1.3.4 Understanding Sustainability – My Perspective

Before proceeding to the definition of sustainability, it is first necessary to describe my perspective on sustainability which is the focus of my research. I view sustainability as a long-term vision; an ideal that is never fully achieved. My view of sustainability is similar to our national efforts to eliminate discrimination and poverty; these are ideals that are not likely to be fully achieved and require continual, long-term effort. Since sustainability is a desired state, it requires a continual process of reflection, innovation, implementation, assessment, and adjustment for its achievement. The benefits to society, and our communities, emanate from this enduring work. It is through this perspective that the key terms related to sustainability are determined.

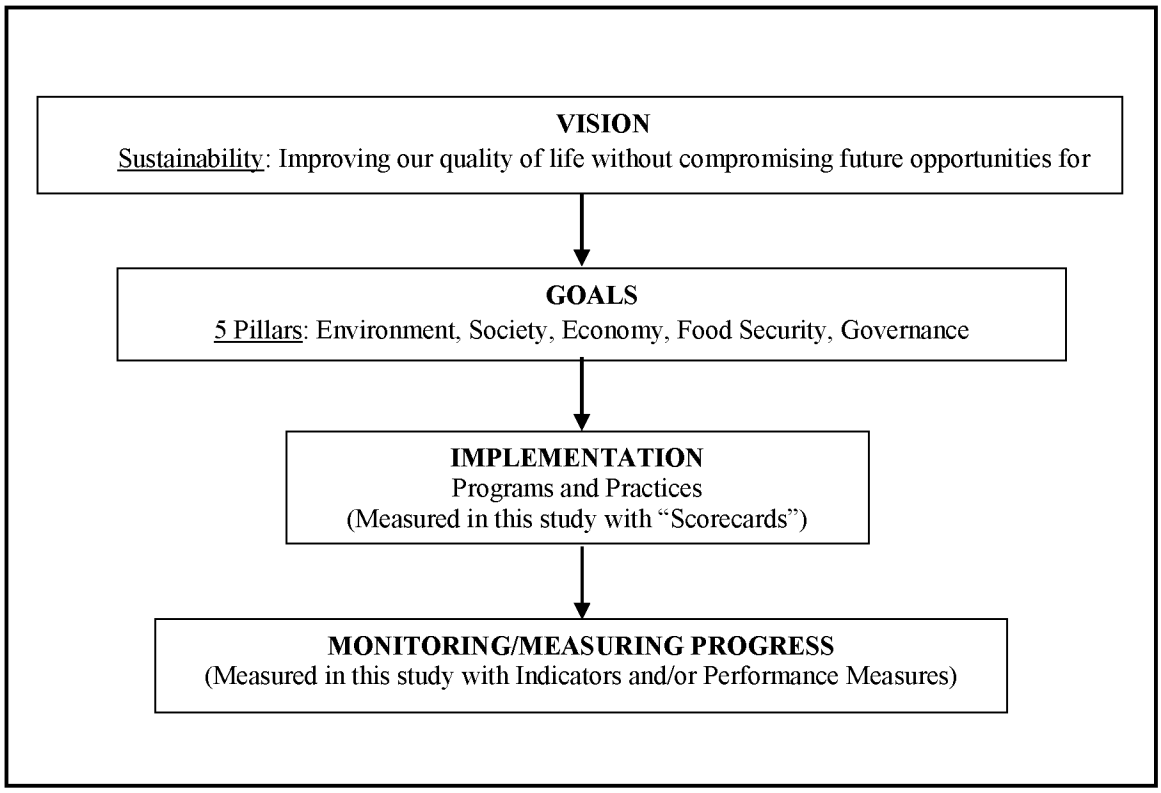


Figure 1.4. Planning Framework Applied to Sustainable Communities

Furthermore, my research is focused on how sustainability is achieved at the community level through local government efforts. The framework that I use to understand how local governments go about their sustainability efforts is borrowed from the American planning profession's framework for preparing plans that seek to improve the quality of life within a community (Berke, Godschalk, & Kaiser with Rodriguez, 2006). The general planning framework consists of a vision statement, goals to reach the vision, programs and practices for achieving the goals, and monitoring of progress (see Figure1.4). In this case, sustainability is the vision we are working toward. The goals are what I refer to as the "five pillars of sustainability" which are: environment, society or equity, economy, food security, and governance (these goals are discussed in greater detail below). These goals form a framework in which the goals are directly linked to programs and practices that are used for goal attainment (Maclaren, 1996). In other words, "Implementation" consists of the programs and practices to achieve the goals and "Monitoring" includes the performance measures and indicators used to evaluate the progress toward meeting the goals.

1.3.5 Definition of Sustainability in this Study

As shown in Figure 1.4 sustainability is essentially the Vision associated with planning for sustainable communities. Definitions of sustainability used in this context abound (de Vries, 2013; Portney, 2003; Roseland, 2005; Thompson, 2010). For the purposes of this research, I define sustainability as improving our current quality of life without compromising future opportunities to improve the quality of life.

1.3.6 Sustainable Communities' Goals include the Pillars of Sustainability

In addition to a vision of sustainability, the planning framework requires a set of goals to reach the vision. The pillars of sustainability, also known as goals of sustainability, are generally referred to in the literature as: environment, equity, and economy or "planet, people and profit" (Daly, 1997; de Vries, 2013; Jacobs, 1993; Maclaren, 1996; Portney, 2003; Roseland, 2005). Environmental goals seek well-functioning ecosystems and avoiding or reducing pollution. Equity goals seek a fair and reasonable distribution of benefits throughout the population and between generations. Economic goals seek to strengthen local economic opportunities. These goals also combine a near-term time horizon with one that transcends generations. Daly (1997) makes the environment the most inclusive category as it is essential to the other two. Likewise, we would not have an economy without society as illustrated in Figure 1.5.

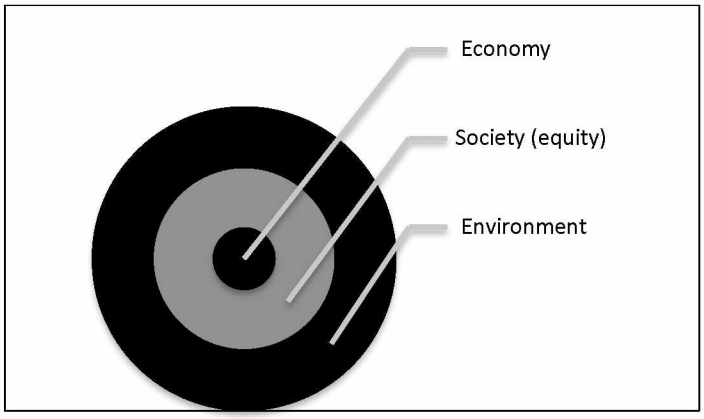


Figure 1.5. Three Pillars of Sustainability (Adapted from Cato, 2012)

Griggs et al. (2013), however, believe that the three 'common' goals are insufficient and suggest additional goals to arrive at a more complete notion of sustainability. Their goals include: food security, governance, thriving lives and livelihoods, water security, clean energy, and healthy and productive ecosystems. Of the goals proposed by Griggs et al., for sustainable societies, it appears that four goals: thriving lives and livelihoods, water security, clean energy, healthy and productive

ecosystems, are already included within the existing goals of economy, environment, and equity while food security and governance are not. My review of twenty-six sustainability and climate change action plans adopted by various cities and counties in the United States and Canada indicates that food security is being treated as a separate goal of sustainability by most local governments; governance less so (Table 1.3).

Furthermore, Maclaren (1996, p190) notes that additional goals may be added to sustainability as they identify supplementary paths used to achieve the end-state of sustainability. Therefore I include both food security and governance as goals of sustainability to be considered by my research as depicted in Figure 1.6.

1.3.7 Implementation: Programs and Practice

Implementation includes the programs and practices used to achieve the five pillars that are the goals of sustainability. In this study, these programs and practices are referred to as sustainability programs and practices and are used by local governments to move toward the ultimate goal of sustainability. My concept of programs and practices is similar to Maclaren's view of the term "sustainable development" which she describes as a process that moves a community towards the ultimate goal of sustainability (p185). Consequently, my definition of a local government's sustainability programs and practices consists of a program or practice that has a stated intent, to enhance or promote one or more of the five goals of sustainability.

There are many practices that can fit this definition. For example, a multi-year local government-supported carpooling and vanpooling program may be considered a sustainability program when its mission or goal is to promote sustainability and because it addresses three pillars of sustainability: reducing greenhouse gas emissions (environment), fulfilling the employment needs of local businesses (economy), and providing an affordable means of transport for low income individuals (equity). The carpooling and vanpooling program may also enhance a community's adaptation capacities and its resilience by reducing reliance on the automobile, building worker skills, and providing low income individuals with a source of disposable income. On the other hand, a transit service would not be considered a sustainable practice if the local government's purpose for providing transit services does not make note of sustainability as a reason for its existence even though the service may meet all three goals of sustainability.

Table 1.3. Sustainability and Climate Action Plan Goal Statements and Topics - Selected US and Canadian Cities and Counties

		Goal Statement Made / Topic Addressed				
Jurisdiction	Plan Date	Economy	Environment	Equity	Food Security	Governance
City of Berkley, CA	2009	X	X	X	X	
City of Brooks, Canada	2010	X	X	X		X
City of Chicago, IL	2013	X	X			
City of El Paso, TX	2009		X	X		
City of Homer, AK	2007	X	X		X	
City of Keene, NH	2007	X	X	X	X	
City of Kingston, Canada	2010	X	X	X	X	X
City of Madison, WI	2011	X	X	X		
City of Minneapolis, MN	2010	X	X	X	X	X
City of Peoria, AZ	2010		X			
City of Saint Louis, MO	2013	X	X	X	X	
City of San Francisco, CA	2002	X	X	X	X	
City of Santa Fe, NM	2010	X	X	X	X	
City of Santa Monica, CA	2006	X	X	X	X	X
County of Boulder, CO	2012		X	X	X	
County of Buncombe, NC	2012	X	X	X	X	X
County of Carroll, MD	2010	X	X	X	X	X
County of Grand Prairie, Canada	2008	X	X	X		X
County of Huron, Canada	2011	X	X	X	X	
County of Kane, IL	2013		X			
County of Mecklenburg, NC	2012		X			
County of Onondaga, NY	2012	X	X	X		
County of Orange, FL	2014	X	X	X	X	X
County of Peoria, IL	2010		X			
County of Scott, IL	2011	X	X	X	X	
County of Strathcona, Canada	2009	X	X	X	X	
Totals Plans 26	**-**	**20**	**26**	**20**	**15**	**8**

Source: The plans reported here were selected on a purposeful basis using general Internet search of sustainability plans adopted by local governments from locations throughout the United States and Canada.

Note: Some city/county sustainability and climate action plans are limited to city/county internal operations, thus, address only environmental topics such as energy conservation, recycling, and green purchasing procedures.

In other words, to qualify as a sustainable practice in this study, *a conscious commitment or intent is required.* Returning to the analogies of discrimination and poverty, the effectiveness of the Civil Rights Act of 1964, as amended and the Economic Opportunity Act of 1964, as amended, are in a large part because each law states a commitment or intent; these being, ending discrimination and eliminating poverty, respectively which directs the authorized actions towards the two desired states.

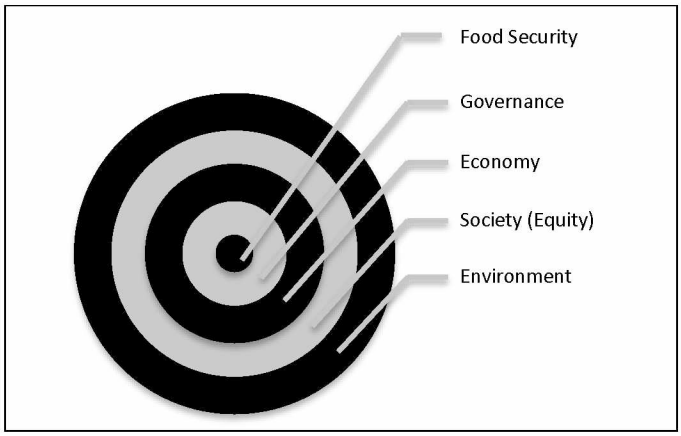


Figure 1.6. The Five Pillars of Sustainability Used in this Study

A sustainable practice must have sustainability as a stated vision (or overall goal) because the vision or goal provides a reason or purpose for the practice. In many organizations, practices are only pursued because the practices have been underway for years without any examination of their purpose. Returning to the transit example, a local government may be providing transit services because they have been doing so for fifty years or more, i.e., they're doing it today because that's what they did last year and not to achieve a goal of becoming a sustainable community or of improving the environment. Indeed, the local government might be providing transit service for some other reason such as unwillingness to build new lane miles or just as likely not actually knowing what they are attempting to achieve by providing transit service. The transit service that has been operating for fifty years or more is considered a sustainable practice only if the local government has recognized it as a practice that includes sustainability as one of its reasons for being. However, a local government does not have to specifically use the word "sustainability" but may use one of the pillars or goals, e.g., environment, equity, etc., to describe the reason for a program or practice. If it does so, then it is considered a sustainable practice. Once again, the crucial point is: the local government must articulate a goal for the program or practice, an intent that acknowledges sustainability or one of the five pillars in order for it to be considered a sustainable program or practice. Lastly, a sustainable practice should include some metric or indicator to measure progress, or the lack thereof, towards achieving the goal.

This study evaluates the degree of implementation by measuring the extent of programs and practices through the use of scorecards. Scorecards containing the various programs and practices related to the five pillars of sustainability were developed based on the work of professional organizations, existing local governmental efforts, and past studies (Association for the Advancement

of Sustainability in Higher Education, 2008; 2011; Office of Management and Budget, 2011; Renewable Choices, 2012).

Measuring Progress was determined through the use of indictors and performance measures. Figure 1.7 illustrates the means for measuring each of the components. The Methods section describes the methods of measurement in more detail.

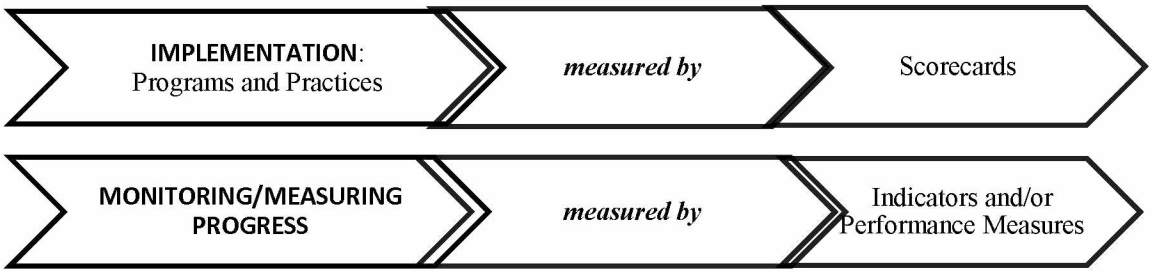


Figure 1.7. How Programs, Practices and Progress are Measured in this Study.

1.3.8 Sustainable Community

Local governments have long been identified as pivotal institutions in fostering the creation of sustainable communities (Global Forum on the Environment, 2010; Mercer and Jotkowitz, 2000; UNCED, 1992). Local governments pursue sustainability efforts with various degrees of commitment. Generally speaking, the degrees of commitment ranges from limited to comprehensive and informal to formal (see Figure 1.8).

	Limited Implementation	Comprehensive Implementation
Formal Rules	Formal rules but limited implementation does not achieve sustainability	SUSTAINABLE COMMUNITIES Formal rules and strong implementation
Informal Rules	NON-SUSTAINABLE COMMUNITIES Informal rules and little implementation	Widely practiced but informal rules - May not be stable and thus not achieve sustainability

Figure 1.8. Degrees of Local Government Commitment

A comprehensive effort is one that is widespread throughout the organization and community. A formal effort is one that is recognized by some statutory authority of the local government, such as an ordinance or approved budget.

It is my conjecture that the efficacy of a local government's sustainability practices will be stronger if it is pursued comprehensively and formally. One reason limited practices rarely become

effective is because of they are inconsistently applied, in other words they have a stop-and-go nature of implementation. An informally adopted practice lacks statutory authority and governing board support and is therefore more likely to be ignored when resources are in short supply or personnel change. Formally adopted and comprehensive practices have institutional support and are thus more likely to be implemented.

Therefore, this study defines sustainable community as a local government that has formally adopted and comprehensively implemented sustainability practices.

In summary, sustainable communities are ones where local governments have articulated a vision of sustainability, identified goals for sustainability, implemented programs and practices to achieve their goals, and monitor progress towards their vision. These facets of local government sustainability efforts may be measured by the existence, or lack thereof, of stated purpose and commitment, formality of implementation efforts, and the use of procedures to measure performance.

1.4 Pilot Study

A pilot study was completed to test the methods and instruments of the research. After the pilot study was completed, adjustments were made to the survey questionnaire. In addition, the pilot study's results suggested additional areas for investigation such as the role of hazards mitigation plans in the pursuit of sustainability by local governments. The results of the pilot study are more fully discussed in Appendix A1.

1.5 Outline of Chapters

Chapter 2 presents a discussion of the study's methods. Chapter 3 discusses the results of the research. A discussion of the study's results is found in Chapter 4. The study's conclusion is provided in Chapter 5 and implications for policy and further research are provided in Chapter 6.

1.6 Limitations of the Study

This exploratory research provides information relevant to theory building about why some local governments pursue sustainability while others do not. In addition, since sustainability may be considered an innovation or innovative practice, as it is a new endeavor in local government activities, the study provides useful information on the conditions necessary to foster innovation at the local government level. Nevertheless, the study has limitations.

A primary limitation of this study is that it is exploratory. As such, the results may not be generalized to the entire population of local governments in the United States at this time. This study considers only fourteen local governments, six in Alaska and eight in Oregon, rather than the

multitude that exists in every state of the Union. My purpose here is to determine what variables foster the pursuit of sustainability by local governments for the purpose of future, more detailed analysis. Therefore, consideration of internal variation across a large number of cases was sacrificed to focus more closely on a few cases in order to identify key variables and relationships. Future research will analyze the variables and relationships discussed here in many more cases to determine if the conclusions are more broadly represented.

The research focused on local governments having a population between 10,000 and 50,000 with all but two cases having populations below 50,000. Therefore, two important groups of local governments were not considered; these being large and very small local governments. Generalizations about these two categories are difficult to make. The study was limited to the United States; thus, generalizations to local governments found throughout the world are not possible.

Some of the study's other limitations are similar to those associated with case study research. For instance, the findings are limited to the cases themselves and cannot be generalized to other local governments. Moreover, the cases were drawn from two states, Alaska and Oregon, each having unique environmental, economic, historical, planning statutes, demographic, and constitutional/legal characteristics. Thus, care must be taken when comparing and contrasting the study's findings with local governments in other states. The study is also limited by the timeframe in which the analysis was made, i.e. 2012-2014. New events, such as a series of extreme weather events, an economic restructuring, or political upheaval, could alter the conditions related to the pursuit of sustainability to differ markedly from those found at the time the study took place.

1.7 Significance of Work

The research reported here casts light on several important elements of sustainability at the local government level. The first aspect is further understanding the variables necessary to foster sustainability by local governments. There are numerous reasons why obtaining a better understanding of these variables is important. For instance, local government building codes have dramatic implications on greenhouse gas emissions as the U.S. Green Building Council (USGBC) reports that that buildings consume 39% and 79% of nation's energy and electricity, respectively (USGBC, 2010). In addition, major financial investments in infrastructure (e.g., arterial roadways, drinking water and wastewater facilities) that are routinely made by local governments direct development patterns and public expenditures for generations. A better understanding, and subsequent communication, of those variables that foster sustainability at the local government level may encourage more local governments to pursue sustainability efforts. As a result, capital

investments may be designed and implemented in more sustainable and resilient ways saving billions, but more importantly saving lives.

Local governments also have major challenges in the areas of energy use, climate change, and creation of livable communities. Yet most municipal practices are based on technologies and land use regulations that are many decades old and thus continue to promote wasteful and unsustainable practices. For example, many municipal building/plumbing codes disallow reduced flow or grey-water toilets resulting in wasteful water use. Identifying the variables that encourage local government sustainability may trigger the revision of out-of-date codes to incorporate more sustainable practices.

Another aspect of the research that is significant is an understanding of what variables might be associated with the failure of local governments to adopt and implement sustainable policies and programs. For practitioners, knowing what not to do is extremely important so that opportunities are not lost or initiatives harmed by self-inflicted wounds.

The research also helps answer the questions posed by Jepson (2007) and Saha (2009b) regarding the lack of understanding of what fosters sustainability at the local government level. By obtaining this information, the research expands the field's base of knowledge.

Alaska's local governments share the same challenges and failings of their national counterparts. Sustainable practices are needed to meet these challenges. Becoming more aware of the key variables necessary for fostering sustainability by local governments can increase the probability that more local governments will implement more sustainable practices and, as a result, address the broad range of climate change related challenges they face more proactively and effectively.

Chapter 2 Methods

2.0 Introduction

This chapter describes the methods used in the study. The chapter discusses the research approach and the use of case study methods and describes how the cases for the study were selected. The chapter includes a discussion of the methods used to analyze the dependent or response variable as well as the independent or explanatory variables.

2.1 Methods

In many ways, attempting to understand why a local government may or may not pursue sustainable practices is like peeling the proverbial onion, as one variable is identified, yet another variable with promise is found. To address this quandary I have employed an interdisciplinary approach, a mixed methods design, and the case study method. This section discusses these aspects of my approach.

2.2 Interdisciplinary Research

The National Academies of Sciences (2004) define interdisciplinary research as research that combines concepts, methods, and theories of two or more disciplines to achieve a better understanding of a phenomenon. Using the theories and tools of multiple disciplines provides for a more comprehensive understanding of a research question because it casts light on the question from different perspectives. An interdisciplinary approach is especially useful when analyzing institutions such as local governments due to their patterns of complex behavior and varied relationships with other institutions. For instance, a local government is an organization having its own internal behavior, operates within a legal framework, is influenced by its community and natural environment, and has varied relationships with other local, state, and federal governments. Thus the tenets and perspectives of several disciplines provide the opportunity for a more complete understanding of local government and sustainability.

Some of the specific concepts employed in this research include organizational behavior theory which suggests that external events may lead to organizational change or responses. In this study, organizational theory provides one of the rationales for considering the potential of external events such as extreme weather for predicting local government pursuit of sustainability. The use of organizational goals and performance measures is another aspect of organizational behavior theory used in this research which states that managers of organizations use such practices to manage organizational change. In addition, Maslow's psychological hierarchy of needs theory (Maslow,

1943) is extended to the community level to explore the potential of a community's level of well-being as a potential predictor of pursuit of sustainability. In addition, the disciplines of community planning and public administration are used to understand the role, if any, of a local government's planning documents (e.g., comprehensive plan, zoning ordinance and strategic plan) in explaining the pursuit of sustainability. Finally, the use of systems theory and complexity theory provide insights for understanding how local governments function and change from internal and external stimuli. The research presented here integrates different disciplines in an attempt to explain why some local governments pursue sustainability while others do not.

2.3 A Mix of Qualitative and Quantitative Methods

Mixed methods research combines qualitative and quantitative research methods (Johnson, Onwuegbuzie, & Turner, 2007) as a means of analysis. Mixed methods also typically employ different methods of triangulation (Denzin, 1978). This study employed a mixed methods research effort in order to obtain a comprehensive understanding of the conditions necessary to foster sustainability in local government. This study employed three methods of triangulation: use of multiple data sources and qualitative and quantitative research techniques. Qualitative data were obtained through case study techniques, interviews, surveys and archival records e.g., budgets, audits, plans, and ordinances. For instance, government documents, survey questionnaire responses and interviews were used to determine whether or not the local government were pursuing sustainability efforts such as energy audits or funding sustainability-related personnel. Thus, if a respondent stated in their interview that their local government funded sustainability efforts, the budget document and questionnaire responses were used to collaborate the statement. Similarly, government databases were used to collaborate interview questions related to the occurrences and types of extreme weather events within the locality. Content analysis was the primary tool used to analyze the qualitative data. Examples of quantitative data include population and economic characteristics, air pollutant emissions, impaired waterbodies, and vital and crime statistics. Quantitative data were analyzed primarily by use of descriptive statistics.

Another facet of my mixed methods approach is a blending of reductionism and complexity perspectives with the use of qualitative and quantitative research methods. The benefit of blending these perspectives is that it provides the ability to focus narrowly on specific variables while also embracing a holistic perspective to consider the explanatory power of categories of variables. Because most research is conducted from a reductionist perspective and because complexity is a new and unsettled theory, I briefly discuss my use of these two perspectives here.

Traditional reductionism seeks to explain a phenomenon by identifying and analyzing the phenomenon's most elemental parts or variables (Ratner, 2008). Identifying potential variables is necessary because it provides an understanding of key relationships and the data needed for analysis. It is also necessary to be aware that the various interrelationships between variables might produce an outcome or behavior that is quite different. In other words, that the whole is greater than the sum of the parts. In addition, the research challenge is compounded if there is more than one system under analysis because the number of variables increases dramatically as does the number of potential relationships. In my research, the behavior of organizations, communities, and environment is dynamic, complex, and consists of a multitude of variables, each having some explanatory power. More to the point, the literature review conducted as part of this research identified more than 50 variables that researchers purport as related to local government pursuit of sustainability. My personal experience working in local government for 25 years suggests that there are more.

Jepson (2007) encountered this conundrum when he failed to establish relationships between local government pursuit of sustainability and a few variables. Rather than a few explanatory variables, Jepson concluded that local government adoption of sustainability efforts can be partially explained by use of the Childe thesis that the linkages between population, organization, environment, and technology affect the ability of a community to sustain itself (Childe, 1950). He further noted that these four categories receive and act upon "signals." Jepson's evocation of the Childe thesis suggests the involvement of complex systems which are, in part, comprised of multiple variables generating "signals", i.e., feedback loops. By definition, a complex system is an interconnected set of elements or agents organized in a way that achieves something and exhibits adaptive, dynamic, goal-seeking, self-preserving, and evolutionary behavior and has the features of nonlinearity, feedback, networks, hierarchy, emergence, and self-organization (Meadows, 2001; Vasileiadou & Safarzyńska, 2010; Wells, 2013). It appears that a local government and the community and natural environment in which it acts all qualify as complex systems.

Understanding how complex systems behave may explain that the necessary conditions for the pursuit of sustainability by local governments is accomplished by identifying patterns within the complex systems, where the patterns are represented by sets of variables having similar qualities (Holden, 2005). Based upon complexity theory (Anderson, 1999; Espinosa & Porter, 2011; Gunderson & Holland, 2002; Holden, 2005), the complex system perspective allows us to confront the large number of variables, each of which may have some explanatory power, by grouping them, and describing the patterns found, if any. To paraphrase Hornstein's (2005) conclusion of complexity theory's contributions to the study of law, it is not that complexity theory best explains the pursuit of sustainability by local governments; it is that complexity theory allows a more comprehensive

evaluation. So, rather than remaining completely reliant on a reductionist toolbox; this study's analysis was buttressed by the addition of the holistic tools provided by the complexity framework.

2.4 Case Study

My research consisted of comparing the characteristics of fourteen local governments and is therefore a multi-case analysis. The case study approach was selected for several reasons. First, Merriam (2009, p. 40) defines a case study as "an in-depth description and analysis of a bounded system" where the case is "an example of some phenomenon, a program, a group, an institution." In the present case, local government serves as the case or the bounded system under investigation and the phenomenon is the adoption and implementation, or lack thereof, of sustainable practices. Another reason for selecting the case study method is because the phenomenon being studied is not readily recognized from its context (Yin, 2008). The research meets Yin's criteria since it is difficult to separate a local government's milieu from its ability to adopt and implement sustainability efforts. Yin also suggests that for "how" and "why" questions, the case study method has a distinct advantage. The proposed research meets this test as well because the research goals consist of answering the questions of "how are local governments different in terms of implementing sustainability practices?" and "why are some local governments implementing sustainable practices while others are not?" Lastly, Merriam (2009, pp. 45-46) states that "the less control an investigator has over 'a contemporary set of events,' or if the variables are so embedded in the situation as to be impossible to identify ahead of time, case study is likely to be the best choice." Once again, this research study meets this standard since there is no method that I may have employed to control local government adoption and implementation of practices. In addition, the variables that differentiate sustainable local governments from non-sustainable sites are unknown. Indeed, the primary goal of the proposed research is to unmask these variables and build a theory that helps explain the propensity of some local governments to pursue sustainability practices while others do not.

Fourteen local government cases were chosen that comprise three groups: four local governments currently implementing sustainable practices that meet the definition of a sustainable site, four local governments that are implementing few or no sustainable practices, and six Alaska local governments with unknown interest in sustainability. The group of six Alaska local governments was considered in order to obtain information on the Alaska local governmental setting as well as to determine if Alaskan municipalities have any unique characteristics that separate them from their national brethren. The selection of Alaska and Oregon local governments also allow an examination of the importance of state mandates to pursuit of sustainability at the local level.

2.5 Case Selection

This was an exploratory study meant to identify variables that have a relationship with local government pursuit of sustainability. It was not meant to be a representative sample. Rather, a purposeful sampling technique was used in order to compare local governments with one another as well as to explore differences that may exist between two states, Alaska and Oregon, having different planning statutes. This exploratory work will lay the foundation for a future, more representative study.

Prior research has used various sampling techniques for analyzing local government sustainability efforts. For instance, samples have been developed from lists of national sustainability award recipients (Schneider, 2007), cities and counties located within specific geographic boundaries (White & Boswell, 2007), samples of cities having adopted sustainability initiatives (Portney, 2003), and data from prior research studies (Jepson, 2007; Saha, 2009a). As noted below, my sample selection was based primarily on three criteria: location, level of sustainability effort, and population.

A key criterion typically used in the study of local governments and sustainability is population size. Most studies have used a population of 100,000 or larger as a sampling rule, although a few have used population size of 50,000 or more. Bell and Jayne (2009) note that this focus on large cities and urban areas limits our understanding of urban systems which can only be improved by studying small local governments Pitt and Basset (2013) also state that more research on small local governments is necessary.

My research seeks to fill this gap by focusing on cities, counties, and boroughs having a population between 10,000 and 50,000 for several reasons. First, the population range of 10,000 to 50,000 includes 12.4% of the cities, counties, and boroughs within the US based upon the 2012 Census of Governments (2012a; 2012b) (see Table 2.1). Cities, counties, and boroughs with populations greater than 99,999 typically have much greater financial and organizational capacity than their lower populated counterparts and thus have more resources to pursue sustainability if they choose to do so. In addition, cities and counties with populations greater than 99,999 represent only 2.2% of the cities and counties in the US. On the other hand, cities, counties, and boroughs with populations less than 10,000 are less likely to have the financial and organizational capacity to engage in sustainability efforts, especially since about half of this group consists of places having populations less than 2,500. Indeed, these smaller communities typically struggle to provide basic functions. Local governments with populations between 10,000 and 50,000 are believed to represent a group that has sufficient resources to pursue sustainability efforts.

Table 2.1. Population Categories

Population	US cities and counties	Alaska cities and boroughs	Oregon cities and counties
Total	38,830	162	277
Less than 10,000	32,247	154	203
10,000 - 24,999	3,163	2	31
25,000 - 49,999	1,642	2	16
50,000 - 99,999	937	3	14
100,000 or more	841	1	13

Source: U.S. Census Bureau, 2012a, 2012b

2.5.1 Alaska Cases

A purposeful sampling strategy was used to select the Alaska sample. The population criteria described above was utilized (10,000 to 50,000), the logistic costs of conducting on-site visits and the desire to include local governments connected and unconnected to Alaska's highway network. The strategy resulted in eliminating from consideration the North Slope and Northwest Arctic Boroughs. Two other adjustments were made to the Alaska sample, this being, the city of Fairbanks being dropped from consideration because it failed to respond to multiple requests to participate. The Fairbanks North Slope Borough and Kenai Peninsula Borough were included even though their populations exceed 50,000 in order to have representation from an interior Alaska community (Fairbanks) and also to provide a comparison to larger populated areas of Alaska. The Alaska part of the sample therefore consists of: Fairbanks North Star Borough, city and borough of Juneau, Kenai Peninsula Borough, Ketchikan Gateway Borough, Kodiak Island Borough, and the city and borough of Sitka.

2.5.2 Oregon Cases

The non-Alaska local governments were selected from the State of Oregon. The State of Oregon was selected because of the state's planning and growth management mandates as well as its history of land use planning and growth management which includes statewide votes on these issues. Since planning and growth management are linked in many ways to sustainability (American Planning Association, 2010; U.S. Environmental Protection Agency, 2013a; 2013b), Oregon was believed to provide a stark contrast between local governments pursuing sustainability practices and those that do so minimally or not at all. Forty-nine cities and counties within Oregon have populations between 10,000 and 50,000 (U.S. Census Bureau, 2012a; 2012b).

An expert panel was used to select the Oregon local governments. Generally speaking, an expert panel consists of individuals who are qualified as experts or specialists by training and experience. The US General Accounting Office (GAO) which regularly conducts research on public policy issues

and programs routinely uses expert panels in their research (GAO, 2014). Data from the U.S. 2010 Census was used to identify the cities and counties meeting the study's population criteria of 10,000 to 50,000 (U.S. Census Bureau, 2010). A total of 36 cities and 11 counties met the population criteria.

Individuals were selected from organizations having knowledge and familiarity of Oregon's environmental issues, sustainability efforts, and cities and counties. Seven individuals were asked to serve on an expert panel (see Table 2.2). The expert panel was provided the list of cities and counties meeting the population criteria and asked to identify those sites believed to be pursuing sustainability efforts as well as those sites not believed to be doing so.

Table 2.2. Expert Panel Members

Name	Organization	Participate?
Anthony Barber, Director	Oregon Office, US. Environmental Protection Agency	Yes
Paul Henson, St. Supervisor	US Fish and Wildlife Service	No
Chuck Perino	State of Oregon, Office of Emergency Management	Yes
Jason Miller, Exec Dir	1,000 Friends of Oregon	Yes
Mike McCauley, Exec Dir	Oregon League of Cities	No
Mike McArthur, Exec Dir	Association of Oregon Counties	Yes
Kathie Dello, Dep. Dir.	Oregon Climate Service - Oregon State University	No
Josh Foster, Program Manager	Oregon Climate Service - Oregon State University	Yes
Sam Goldstein, Director	Oregon Community Programs- Rural Development (USDA)	No
Matthew Crall, Section Chief	State of Oregon, Sustainability Section	Yes
Allison O'Brien	US Department of Interior, Office of Environmental Planning and Compliance	Yes

Each panel member was provided an online questionnaire consisting of a narrative explaining the research topic and describing what a sustainable site is and a list of cities and counties within Oregon that meet the population criterion. The panel rated the cities and counties based on personal knowledge of the cities' or counties' sustainability practices or its reputation as a place pursuing sustainability. This method of selecting cases was used by Altschuler (1965) in his study of city planning practices where the cities of Minneapolis and Saint Paul were selected for analysis based on their reputation for good city planning by professional planners. The questionnaire is shown in Appendix A2. Panel responses identified seven candidate cities and counties meeting the "practice sustainability" criteria as shown in Table 2.4. The seven candidate sites were contacted by email beginning on January 4, 2014 and asked to participate. An attempt was made to have an equal number of cities and counties; however, some chose not to participate as noted in Table 2.3.

Table 2.3. Cities/Counties that Practice Sustainability

City/County	Panel responses*	Agreed to participate?
Ashland city	6 of 7	Yes
Oregon city	5 of 7	No, too busy
Tigard city	5 of 7	Multiple contacts; No response
Milwaukie city	5 of 7	Yes
Tualatin city	4 of 7	Multiple contacts; No response
St. Helens city	1 of 6	Yes
Hood River county	6 of 7	Yes
Tillamook county	5 of 7	Yes
Clatsop county	4 of 7	Yes

*Number of panelists indicating city/county practices sustainability.

The same process was used to select cities and counties not thought to be practicing sustainability. Panelists, however, were less certain about cities and counties not practicing sustainability, as Table 2.3 illustrates. A selection table was prepared ranking the cities and counties with the lowest number of "Is practicing sustainability" and highest number of "Not Practicing Sustainability" responses. The web sites of these cities and counties were then reviewed to identify existence of sustainability efforts. If the web site provided strong evidence of work or plans in the area of sustainability or climate change, the city or county was dropped from consideration.

Once the subject cities and counties were selected they were sent an email and contacted by phone to explain the research effort and request their participation in the study. If a city/county declined to participate, the next city/county on the selection table was picked and contacted by phone to request their participation in the study. The process was repeated until the appropriate number of cities and counties were obtained.

For the remainder of this study, the type of government, e.g., city, county and borough, for each case is dropped for simplicity. Also, the use of the terms case and site have similar meaning and are used interchangeably.

2.6 Data Collection Procedures

2.6.1 Overview

Data were obtained using three procedures. First, a computer-based survey was distributed to each participating local government (Appendix A3) to identify organization-based data on the variables that may be associated with sustainability efforts undertaken by local governments. Secondly, interviews of key municipal personnel, e.g., mayor, manager, planning director, etc., took place. The purpose of the interviews was to obtain information that does not easily lend itself to a questionnaire; for instance, determining the amount of employee participation in the decision-making process of a local government. Other information, such as historical events that may have influenced how the local government presently acts (e.g., a taxpayer revolt, scandal, or extreme weather event)

and how individuals may perceive the importance of certain variables were identified via both the survey and interviews. The survey preceded the interviews, to allow additional probing of questionnaire responses. The interview questions are presented in Appendix A4.

A review of specific documents (e.g., budgets, ordinances, plans, etc.) took place to better understand the financial capacity, personnel capacity, and relative strength of the sustainability practices. Census documents and databases were also reviewed for demographic characteristics that may be associated with sustainability, such as a population's income and education levels. Data were also obtained from numerous governmental agencies and academic institutions such as: U.S. Environmental Protection Agency, U.S. Department of Agriculture, National Oceanic and Atmospheric Administration, Alaska Department of Community and Regional Affairs, and National Drought Mitigation Center.

Several methods were used to analyze the data. Narrative summaries of the documents and content analyses were performed to identify key information, such as: whether sustainability is identified as a goal in an adopted plan, funds and amounts budgeted for sustainability, ordinances or resolutions that promote sustainable practices are on record, number of employees dedicated to sustainability efforts, etc. The use of standard search tools in software packages e.g., Microsoft Word and Adobe, were used to find words and word phrases. These searches were supplemented by coded content searches using the NVivo qualitative data analysis software package. This data provided information about what rules are used to implement sustainability efforts and what are the types and forms of institutional support typically used for such efforts. Patterns of differences and similarities were also identified by reviewing municipal documents. Moreover, the document analysis helped determine if local governments are adopting formal rules but not implementing sustainable practices, as well as, identify the contrary situation of failing to adopt formal rules yet implementing sustainable practices.

The survey and document content data were analyzed using descriptive statistics such as average years of employment, number of employees, average mill levy, etc., to provide an understanding of conditions that may or may not support sustainability efforts. Interviews were taped and transcribed. Information obtained through interviews was also analyzed for patterns of differences and similarities as well as for explanations of why certain actions are taken or not taken as well as the perceived importance of certain variables. For example, is the propensity of local government sustainability efforts related to form of government, executive job tenure, type of sustainability program, voting preferences, education, and managerial education and experience? Lastly, the three types of data were analyzed as a method of triangulating on certain variables and patterns that have explanatory power.

2.6.2 The Response Variable: Determining the Sustainability Score

This exploratory study is focused on variables that may be related to a local government's pursuit of sustainability; therefore, it is necessary to distinguish between local governments that practice sustainability and those that do not. As previously discussed (see Chapter 1), the definition used to distinguish between local governments is: A sustainable local government is one that adopts sustainability rules, such as ordinances and policies, and implements sustainability efforts as evidenced by budgets, assigned personnel, design standards, etc. Scores from a content analysis and two scorecards were used to determine an overall "Sustainability Score." The sustainability score was used to distinguish between local governments that had adopted sustainability measures and were implementing them and those that were not.

Two methods were employed to determine a site's sustainability score. The first method consisted of a content analysis of the three primary planning documents used by local governments to guide their respective community's physical, spatial and socio-economic development. The second method comprised the use of two scorecards to rate the type of sustainability efforts undertaken as well as the level of effort made by the fourteen local governments. Each method is discussed in the following sections.

2.6.2.1 Content Analysis

One means of determining the extent to which local governments pursue sustainability programs and practices is through the use of their planning powers. These are articulated through three planning documents common to local governments.

1. The comprehensive plan
2. The zoning ordinance
3. The hazards mitigation plan

The first two, the comprehensive plan and zoning ordinance, are the two most common expressions of local government planning; they guide the form, location, and manner of a community's development. The third type of plan, the hazards mitigation plan, is another common local government plan. The hazards mitigation plan identifies measures a community should implement to adapt to and mitigate the effects of natural, human-caused and technological disasters such as flooding, terrorism and electrical grid failures. The hazards mitigation plan may also be used to address extreme weather and wildfire that may be related to climate change. The level of a local government's pursuit of sustainability and resiliency may be gauged by the statements and measures found within these three planning documents.

2.6.2.2 Content Analysis Procedures

A content analysis was performed to analyze local government use of land-use planning documents to pursue sustainability efforts and address climate change. Content analysis seeks to make inferences from text and is performed by first identifying the key terms under consideration and then developing a coding and scoring system for measuring the extent to which a document uses the term (Krippendorff, 1980; Neuendorf, 2002). In this case, identifying the existence of key terms and their use provides a method for determining the level of focus on sustainability, climate change, and disaster resilience by the three types of planning documents.

Content analysis is frequently used to evaluate plan quality and subject matter (Berke and Godschalk, 2009; Dola & Noor, 2012; Lyles, Berke & Smith, 2012, 2014; Norton, 2008). Most content analyses have addressed local master or comprehensive plans and hazards mitigation plans. Although a few evaluations of climate action plans are found in the literature, none used the content analysis approach. Also, the review of the literature did not disclose any content analysis of sustainability plans nor was previous research found that analyzed the linkages between the comprehensive plan, hazards mitigation plan and the zoning ordinance. Moreover, the review of the literature did not reveal the use of content analysis of local planning documents to determine the seriousness by which local governments pursue sustainability. Thus, it appears that this exploratory research is charting new ground.

2.6.2.3 Coding

Based upon the literature and a review of municipal sustainability plans, ten subject categories were created to rate the three planning documents on aspects of sustainability, sustainable development and climate change (Benedict, McMahon, & The Conservation Fund, 2006; Roseland, 2009; van Hemet, 2007). The categories and criteria for content characteristics this research are shown in Tables 2.4 through 2.6.

Table 2.4. Criteria for Sustainability & Climate Change Strategies in the Comprehensive Plan

Category		Criteria
Goal/policy	1.	Sustainability identified as a goal/policy
	2.	Climate Change identified as a goal/policy
	3.	Resilience identified as a goal/policy
Plan process	1.	Assumptions contain references to: climate change, extreme weather, resource scarcity, food security, affordable housing, governance, or natural environment/ecosystem
	2.	Monitoring process described; performance measures used
	3.	Criteria for plan update
Public participation	1.	Policies addressing community engagement, public participation and involvement
	2.	Policies addressing governmental transparency
Sustainability & Climate change	1.	Recommendation for a separate Sustainability Plan
	2.	Recommendation for a separate Climate Action Plan
Economy	1.	Policies addressing workforce development (e.g., training, education)
	2.	Policies addressing local business retention and creation
	3.	Policies addressing non-preferred type of economic activity (industry/firm compatibility goals/standards)
	4.	Policies addressing revitalization
	5.	Policies addressing livable wages, minimum wages
	6.	Policies addressing poverty and low income
Land Use	1.	Policies addressing the conservation of ecologically valuable natural areas (e.g., wetlands, natural area connectivity and continuity, wildlife corridors, non-development zones)
	2.	Policies addressing native species use, tree planting, etc.
	3.	Policies addressing stormwater management
	4.	Policies addressing agricultural land preservation
	5.	Policies addressing open space
Disaster Resilience	1.	Policies addressing land development or redevelopment in high-risk zones
	2.	Policies addressing hazard mitigation and disaster preparedness
	3.	Policies protecting public infrastructure from hazards
	4.	Policies addressing building design and building codes to address hazards, e.g., special engineering reports, flexible piping, elevation
	5.	Policy(s) addressing reduced exposure and vulnerability to natural, human or technological disasters.
	6.	Policy stating sustainability as a means for improving disaster resilience made
	7.	Policies addressing climate change adaptation, e.g., design standards for docks (sea level rise) culverts and bridges (floods), drought (reservoirs, conservation), etc.
Housing	1.	Policies addressing affordable housing, homelessness
Transportation	1.	Policies addressing transportation management, e.g., TSM techniques, HOV lanes, car/van pooling
	2.	Policies addressing access and mobility, e.g., transit, bicycling, trails, sidewalks
Conservation	1.	Policies addressing energy efficiency and/or conservation
	2.	Policies addressing renewable energy (e.g., wind turbine permits/standards, solar envelope protection, etc.)
	3.	Policies addressing water conservation, e.g., water audits, low-flow showerheads/toilets, reuse
	4.	Policies addressing waste reduction, recycling, reuse
Health & Safety	1.	Policies addressing noise
	2.	Policies addressing light pollution
	3.	Policies addressing air quality, e.g., particulates, GHG emissions
	4.	Policies addressing water quality
	5.	Policies addressing community safety: traffic injuries, toxic/ hazardous materials location and handling
	6.	Policies addressing public health; teen pregnancy, obesity, heart disease, diabetics, sexually transmitted diseases, asthma
	7.	Policies addressing violent crime, e.g., community policing, homicide, rape, robbery, aggravated assault, domestic violence
Food security	1.	Policies addressing food security, e.g., farmers' markets, community gardens, home-based commercial agriculture

Table 2.5. Criteria for Sustainability & Climate Change Standards in the Zoning Ordinance

Category	Criteria
Land Use	1. Standards for protecting sensitive land forms (e.g., wetlands, forests, stream bank, riverbank, etc.) 2. Standards for development in sensitive/hazardous zones 3. Standards for non-development zones 4. Standards for noxious weeds 5. Standards addressing siting of hazardous materials handling, processing, manufacture 6. Standards addressing maintenance or enhancement of natural vegetation including landscape standards 7. Standards addressing green infrastructure, especially on-site management of stormwater 8. Standards for cluster development/planned unit development 9. Standards for open space 10. Standards requiring a detailed assessment, analytical report, EA or EIS (or equivalent) analysis prior to "large-scale" development (other than destination resorts)
Disaster Resilience	1. Standards addressing extreme events (e.g., wind storms, earthquakes, wildland fires, other than floods)
Housing	1. Standards for affordable housing
Transportation	1. Standards/requirements for traffic impact analysis or transportation system impacts 2. Standards addressing non-single occupied vehicle transport, e.g., bonus/incentives tied to public transit connectivity
Conservation	1. Standards addressing water conservation e.g., building codes - low flow toilets and showerheads, grey-water usage 2. Standards for solar access 3. Standards addressing use and protection of renewable energy sources other than solar 4. Standards for recycling 5. Standards addressing energy use related to lighting (e.g., parking lot LEDs) 6. Standards addressing energy use of buildings, includes LEED design
Health & Safety	1. Standards addressing light pollution 2. Standards addressing noise pollution 3. Standards for wood stoves (particulate pollution)
Food security	1. Standards addressing food production, especially in residential zones 2. Standards addressing community gardens

Table 2.6. Criteria for Sustainability & Climate Change Strategies in the Hazards Mitigation Plan

Category	Criteria
Goal/policy	1. Climate change/global warming acknowledged 2. Sustainability (a described role or goal) stated 3. Importance of resilience noted, e.g., building community resilience, economic resilience
Plan process	1. Use of monitoring, performance measures
Land Use	1. Acknowledgement of land use plans connection noted 2. Recommendations for land use plan made 3. Non development zone recommendation(s) made 4. Buy-out recommendations made 5. Building code recommendations made 6. Zoning recommendations made
Vulnerable population	1. Vulnerable populations discussed 2. Sheltering discussion (other than note of sheltering sites)
Infrastructure	1. Recommendation(s) to modify/revise infrastructure, physical plant 2. Recommendation for comprehensive review to modify/revise infrastructure designs
Conservation	1. Energy security noted 2. Water conservation recommendation
Food security	1. Food security noted

2.6.2.4 Coding Process

For each site I obtained copies of the comprehensive plan: City and Borough of Juneau (2013), City and Borough of Sitka (2007), City of Ashland, (2012a), City of Milwaukie (n.d.), City of St Helens (n.d.), County of Clatsop (2007), County of Columbia (1984), County of Crook (1978), County of Hood River (1991), County of Tillamook (1982), Fairbanks North Star Borough (2005), Kenai Peninsula Borough (2005), Ketchikan Gateway Borough (2000), Kodiak Island Borough (2008); zoning, land-division, related ordinances (e.g., health and safety): City and Borough of Juneau (2014), City and Borough of Sitka (n.d.), City of Ashland, (2014), City of Milwaukie (2012), City of St Helens (2014), County of Clatsop (2014), County of Columbia (n.d.), County of Crook (n.d.), County of Hood River (n.d.), County of Tillamook (n.d.), Fairbanks North Star Borough (n.d.), Kenai Peninsula Borough (n.d.), Ketchikan Gateway Borough (n.d.),Kodiak Island Borough (n.d.), and hazards mitigation plan: City and Borough of Juneau (2009), City and Borough of Sitka (2010), City of Milwaukie (2012), County of Clackamas (2013), County of Clatsop (2008), County of Columbia (2009), County of Crook (2010), County of Hood River (2012a), County of Tillamook (2007), Fairbanks North Star Borough (20132), Kenai Peninsula Borough (2014), Ketchikan Gateway Borough (2008), Kodiak Island Borough (2014a).

Word and phrase searches were conducted of each document using Adobe Acrobat XPro and NVivo10. When a word or phrase was identified in the text, the associated text was read in order to determine if the term was being used in proper context to the study's purpose. For example, one aspect of sustainable development is on-site management of stormwater. The zoning and land-division ordinances contained numerous references to the terms stormwater and drainage; however, few references described measures for managing stormwater or drainage on-site through the use of

pervious surface applications or other sustainable development techniques. In this case, if the reference did not describe the use of a sustainability technique it received a score of zero.

2.6.2.5 Calculation of Scores

A scoring method was developed following the procedure employed by Lyles, Berke and Smith (2012) to evaluate state hazard mitigation plans. The scale used is binary 0 or 1; (i.e., 0 if a key word or phrase was not identified and 1 if a key word or phrase was identified in the document). For policies and strategies, an ordinal scale ranging from 0 to 2 was used subject to the following criteria: 0 if not stated, 1 if stated, and 2 if stated and expanded upon with direction given. For example, a common sustainable development strategy is to increase the availability of affordable housing. If a plan had a briefly worded goal statement such as "Increase affordable housing" it was awarded a score of 1. If the plan's goal of affordable housing went beyond the simple statement to include a discussion of the goal's purpose and/or one or more methods for achieving the goal it was awarded a score of 2. This scoring method was also used to evaluate the hazards mitigation plans. For the zoning ordinance, scores ranging from 0 to 2 were determined by: 0 for absence of standards, 1 if a minimal standard was identified, and 2 if detailed standards were present. For instance, if a zoning ordinance did not address noise pollution it received a score of 0, if noise was addressed with a brief standard such as "noise should not create a nuisance" it received a score of 1; if the standard contained more specifics such as decibel level criteria or time of day restrictions it received a score of 2.

After each plan and ordinance was scored, the scores were standardized based upon the work of Lyles et al., (2012) and as described previously. This procedure ensured that all standards were compared on a similar scale ranging from 0 to 2. The items in each category were then totaled and then divided by the number of items within the category.

2.6.2.6 Scorecard Procedures

In order to determine the extent to which a given community practiced sustainability, a way to measure this is required. To do this, a list of sustainability indicators was developed to serve as a "scorecard", the second method employed to evaluate the response variable. Sustainability scorecards are commonly used to describe the extent to which an organization pursues sustainable programs and practices (Association for the Advancement of Sustainability in Higher Education [ASHE], 2008; 2011; Office of Management and Budget, 2011; Renewable Choices, 2012). The indicators provide information on various aspects of a city's pursuit of sustainability such as use of formal or informal methods, amount of organizational support, type of sustainability program(s), and intensity of effort.

The final score provides a measure of the extent to which a city has adopted sustainability programs and practices, ranging from no detectable efforts to pursuit of a comprehensive set.

Two scorecards were also used to determine whether or not a local government was pursuing sustainability. The scorecards provide information on various aspects of a local government's pursuit of sustainability such as use of formal or informal methods, amount of organizational support, type of sustainability program(s), and intensity of effort. The final scores provide an indication of where a local government lies on a continuum of sustainability programs and practices, ranging from no detectable efforts to pursuit of a comprehensive set.

The first scorecard (Scorecard 1) was developed by the author and seeks to answer the questions "Is the local government pursuing sustainability? And "If so, in a formal or informal manner?" Formal adoption methods consist of actions that are considered and approved by the local government's governing body; such as ordinances, resolutions, and budgets. Informal adoption methods do not receive the consideration of local government's governing body and are administrative in nature such as operating procedures and policies. Informal methods may be used to implement formal adoption methods; thus, if a local government had evidence of formal adoption methods it received no credit for informal methods.

The second scorecard used in this study (Scorecard 2) was adapted from the Sustainability Tracking and Assessment System (STAR) scorecard developed by the ASHE (2008; 2011). The ASHE scorecard was developed for college campuses, and with slight revision, is applicable to local governments. This scorecard seeks to answer the questions "How well is the local government pursuing sustainability in terms of level of effort or implementation intensity? and "In what areas is the local government pursuing sustainability?". More detail on each of the efforts and how the scores were compiled is included in Appendix 5.

By combining the results of the two scorecards and content analysis into a single sustainability score, we can determine whether or not a local government is "saying all the rights things" yet failing to do any real work on sustainability. The sustainability score also provides insight on whether formal or informal adoption measures make a difference in the pursuit of sustainability.

2.6.3 Explanatory Variable Procedures

2.6.3.1 Hypothesis Building

Hypothesis building was the method used to select explanatory variables for the study. In hypothesis building, the researcher selects variables that are believed to prove or disprove a theory which seeks to explain a phenomenon (Silverman & Marvasti, 2008). In this study, the explanatory variables evaluated comprise the six categories believed to explain whether or not a local government

pursues sustainability: 1) community context, 2) institutional setting, 3) environmental stressors, 4) political party affiliation, 5) new political culture and 6) community well-being. Two of these categories, community context and institutional setting, include variables that have been identified as being related to government pursuit of sustainability in previous studies. The category of community context includes variables describing a community's social-demographic-economic characteristics such as type of household, income, education and occupation. The category of institutional setting includes variables describing the local government as measured by form of government and use of strategic planning and performance measures. New political culture is a category developed by Saha (2009a) that measures a community's openness to ideas as a means of explaining local government pursuit of sustainability.

Additional categories of variables that I believe have explanatory potential include: environmental stressors, political party affiliation and community well-being. The literature identifies few variables within the natural environment category. The environmental stressors category includes variables that describe the community's or region's environmental stressors such as drought conditions, experience with extreme events, and air and water quality. Political party affiliation measures community's voting preferences for one of the two major political parties in the United States. New political culture measures a community's openness to new ideas and new approaches. Figure 2.1 illustrates the variable categories and the number of variables within each category.

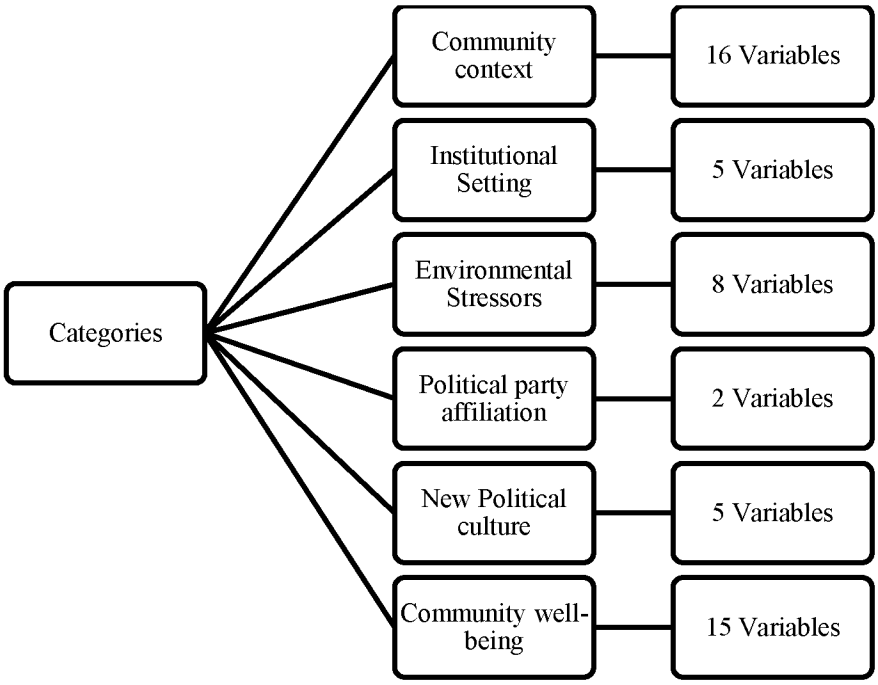


Figure 2.1. Independent Variable Categories Associated with Pursuit of Sustainability.

The last variable category, community well-being, measures a community's economic and social welfare. This study also theorizes that one other community related variable is related to a local government's pursuit of sustainability; this being, community well-being. Community well-being has many definitions but all of them share common themes; these being: a state of existence where material needs are met, where individuals and groups can act to fulfill their goals and basic life satisfaction (Gallup, Inc., & Healthways, Inc., 2014; Hajkowicz, Heyenga & Moffat, 2011; McCrea, Walton & Leonard, 2014; Tonts, Plummer, & Lawrie, 2012; Ribova, 2000). The idea that community well-being may be related to a local government's pursuit of sustainability is based on Maslow's hierarchy of needs (1943) which contends that basic human needs such as security, shelter, and food must first be satisfied before individuals aspire to higher levels of needs such as self-actualization. Translating Maslow's theory from individuals to communities would mean that a community must first address basic socio-economic needs such as housing, safety, employment and health before considering a higher level of needs such as moving forward with sustainability programs and practices. Furthermore, these socio-economic aspects of community well-being include activities that most local governments are directly involved in, such as crime prevention, safety, housing, and health care. My hypothesis is that local governments serving communities with low measures of community well-being will focus their resources on addressing basic socio-economic needs rather than on a higher need such as sustainability. The following sections describe the study's variables, data sources and results.

2.6.3.2 Community Context

Community Context describes community attributes such as demographic and locational characteristics. These attributes are based on a review of the literature. Previous research has shown a positive relationship between local government sustainability and population growth, (Conroy & Iqbal, 2009; Saha, 2009a), age (Saha, 2009a), creative class composition (Budd et al., 2008), decennial population change (Conroy & Iqbal, 2009), education (Portney & Berry, 2010; Saha, 2009a; White & Boswell, 2007), median household income (Conroy & Iqbal, 2009) and racially homogenous population (Saha, 2009a). One other variable, manufacturing occupation (Portney, 2003), was shown to have a negative relationship with local government sustainability. The variables and data sources which comprise the community context category are shown in Figure 2.2 and Table 2.7.

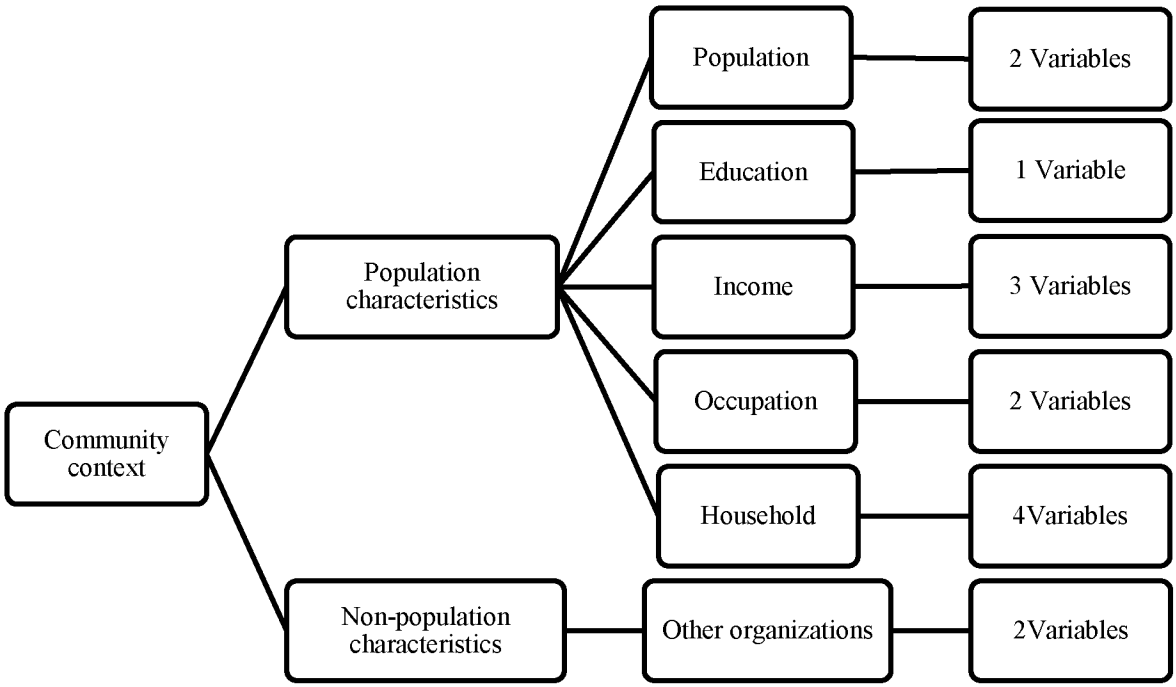


Figure 2.2. Dimensions and Attributes of Community Context

Table 2.7. Community Context Variables that may be Associated with Pursuit of Sustainability

Category	Attribute	Variable	Data Source
Community Context	Population characteristics	Population change 2000 – 2010	US Census
		Population 20-44 years of age	US Census ACS 08-12
		Population 25 years of age or more - High School Graduate	US Census ACS 08-12
		Population 25 years of age or more w/ Bachelor's degree or higher	US Census ACS 08-12
		Unmarried and non-traditional households	US Census ACS 08-12
		Per capita income	US Census ACS 08-12
		Median Household Income	US Census ACS 08-12
		Population at and below poverty	US Census ACS 08-12
		Household residency - 1999 and longer	US Census ACS 08-12
		One race (% of total population)	US Census ACS 08-12
		Female labor force composition	US Census ACS 08-12
		Occupation	US Census ACS 08-12
	Non-population characteristics	Existence of community-based sustainability organization	Interview and Survey
		Existence of tax-payer group	Interview and Survey
		Site of major university	Government Records
		Direct citizen participation	Interview and Survey
		Formal environmental justice efforts	Interview and Survey

This study's community context attributes consist of the percent decennial population change, and the percentage of each site's population in the following categories: 20 to 44, education those 25 years of age or older with an education attainment of bachelor's degree or higher, unmarried and non-traditional households, all those at or below poverty, household residency of 1999 or longer, households with two races or more, female labor force participation (the percent of the locale's total female population that is participating in the labor force), manufacturing occupation, and professional, technical, scientific and education occupation. The variables: at or below poverty, household residency of 1999 or longer and manufacturing occupation were multiplied by -1 when calculating the index for this category because these variables are believed to be negatively associated with local government pursuit of sustainability.

In addition, each site's per capita income and the percent change of per capita income growth between 2000 and 2010 were included. Per capita income growth was included in order to obtain a measure of each site's general economic performance over the decade. Presumably a community that has high per capita income growth is benefiting economically which would have a positive effect on the pursuit of sustainability.

Another variable within the community context category measures a community's creative class composition. The creative class is a term used by Florida (2002) that includes professionals and occupations that are based on knowledge and problem-solving as well as artisans. Florida's hypothesis is that the creative class drives creativity which in turn drives economic growth. A high degree of education is one of the hallmarks of the creative class. The variables educational attainment of a bachelor's degree or higher and professional, technical, scientific and education occupation are included as a measure of a site's creative class that has been shown to be associated with innovative places (Florida, 2005). Because three cities are included in the study, it was not possible to use the Economic Research Service's (2014) Creative Class database which includes state and county values only.

Lastly, two dummy variables were included to represent the existence of a non-government organization within the community dedicated to sustainability programs and the site of a major university; a value of one (1) was awarded if the site had a sustainability related organization and zero (0) if it did not. The same procedure was used to represent the existence of a major university.

Data for the variables decennial population change and per capita income growth were collected from the 2000 and 2010 US Census (2000; 2010); all other demographic data were collected from the American Community Survey (ACS) 2008-2012 (2012c). Data for the existence of non-government sustainability organizations were obtained from registry of businesses for both Alaska and Oregon. Each registry was sorted by county (the counties of Clackamas, Columbia and Jackson were used for

the cities of Milwaukie, St Helens and Ashland, respectively) and then searched for all businesses having the terms: sustainability, housing, energy or environment. Once a business having the term in its name was identified, the full name of the organization was reviewed to determine if it was associated with a sustainability effort. For example, if an organization's name inferred that its purpose was affordable housing it was included; however, if the name inferred a housing manufacturing association it was not. For colleges and universities, an online search was completed providing listings of colleges and universities in each state. Only four-year degree colleges and universities qualified for the award of 1 for this variable.

2.6.3.3 Institutional Setting

The category, Institutional Setting, contains variables related to a local government's ability and willingness to undertake sustainability programs. Prior research indicates that a local government's ability to pursue sustainability efforts is related to its financial and personnel capacity (Pini et al. 2007; Parkinson & Roseland, 2002), planning documents (Herman, 2010; Mercer & Jotkowitz, 2000), senior government mandates (Parkinson & Roseland, 2002, Saha, 2009a), stability in terms of governing body and senior management turnover rates and recall measures (Johnson & White 2010), support of governing body and senior management for sustainability (Parkinson & Roseland, 2002), and use of annual reports (Mercer & Jotkowitz, 2000). The literature reports mixed results on a relationship between pursuit of sustainability and the council-manager form of government as opposed to mayor-council form. Teodoro (2009) reported a positive relationship for the council-manager form, while Saha (2009a) did not find any relationship; nevertheless, the variable is included here for analysis. Data for these variables were collected from the following sources: survey questionnaires, interviews, and archival records. Figure 2.3 and Table 2.8 illustrate the variables and data sources associated with the category of institutional setting.

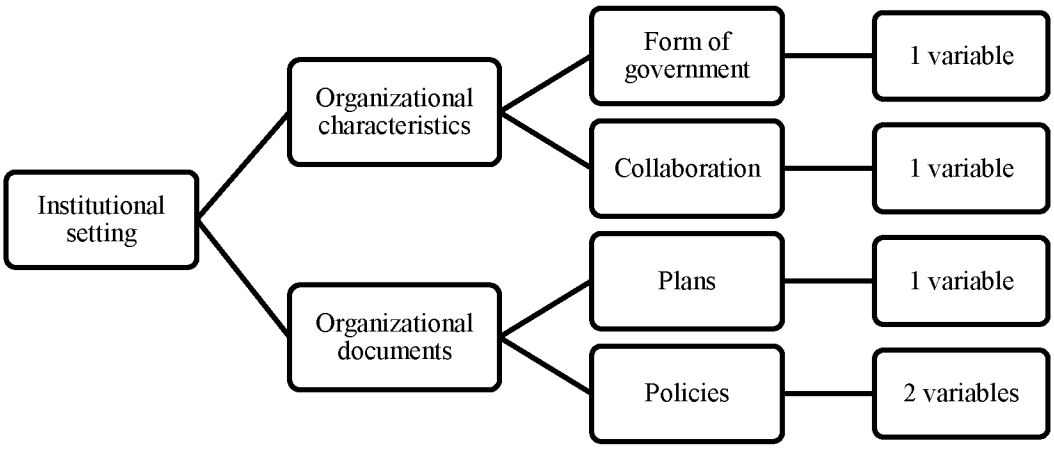


Figure 2.3. Dimensions and Attributes of Institutional Setting

Table 2.8. Institutional Setting Variables that may be Associated with Pursuit of Sustainability

Category	Attribute	Variable	Data Source
Institutional Setting	Organizational characteristics and documents	Senior government mandates	Government records
		Council-manager, mayor-council	Government records
		Adopted strategic plan	Government records
		Annual performance report	Government records
		Adopted ordinance and/or resolution supporting sustainability measures	Government records

A review of each site's budget and audit documents revealed that all sites are in sound financial condition and have the financial wherewithal to pursue sustainability efforts if they choose to do so. Moreover, all of the sites function as municipalities; indeed, Oregon counties have home-rule status (State of Oregon, 2014), thus there is no real difference between Alaska boroughs and Oregon cities and counties. None of the sites report any actions in the area of environmental justice and all of the sites have a history of stability at the senior management and governing body levels. Therefore, financial capacities, type of government, environmental justice, and senior management/governing body stability were not included in the Institutional Setting category.

The variables that are used within the Institutional Setting category to differentiate between sites that pursue sustainability and those that do not consist of: whether there is stability in senior management and governing body tenure (election records), use of performance measures (budget documents), existence of senior government mandates (state statutes), manager versus non-manager form of government (charter/incorporation records), and adoption of a strategic plan (interview).

Coding for the variables in the Institutional Setting category consisted of awarding a value of 1 if the variable was found to exist and 0 if not.

2.6.3.4 Environmental Stressors

Environment stressor is the third category of variables to be considered for its relationship with local government pursuit of sustainability. The variables within the environmental stressors category were selected based upon their inclusion in local government sustainability plans such as air and water quality (county of Carroll, 2011; city of El Paso, 2009; city of Keene, 2007; city of Santa Monica, 2006; county of Strathcona, 2007), environmental conditions that affect citizen perception on the reality of climate changes such as local climate conditions and extreme weather (Egan & Mullin, 2014; Hansen, Satoa, & Ruedy, 2012; Myers, Maibach, Roser-Renouf, Akerlof, & Leiserowitz, 2012; Owen, Conover, & Julio, 2012; Schwartz, 2010), and formally designated pollution sites commonly known as Superfund and Brownfield sites (Lubell, Feiock, & Handy, 2009).

One other variable, hazard mitigation efforts, is also included in the environmental stressors category because contemporary disaster preparedness efforts stress the need for addressing extreme weather events, climate change adaptation measures, and disaster resistant development techniques (Federal Emergency Management Agency, 2013; Intergovernmental Panel on Climate Change, 2013; Moss et al., 2013; National Oceanic and Atmospheric Administration [NOAA], 2013a). Hazard mitigation efforts may be considered an impetus for sustainability because they recognize the potential effects of pollution, extreme weather and other hazards and prescribe actions to reduce exposure to help make these communities more disaster resilient. Figure 2.4 and Table 2.9 illustrate the variables and data sources for the variables within the category Environmental Stressors.

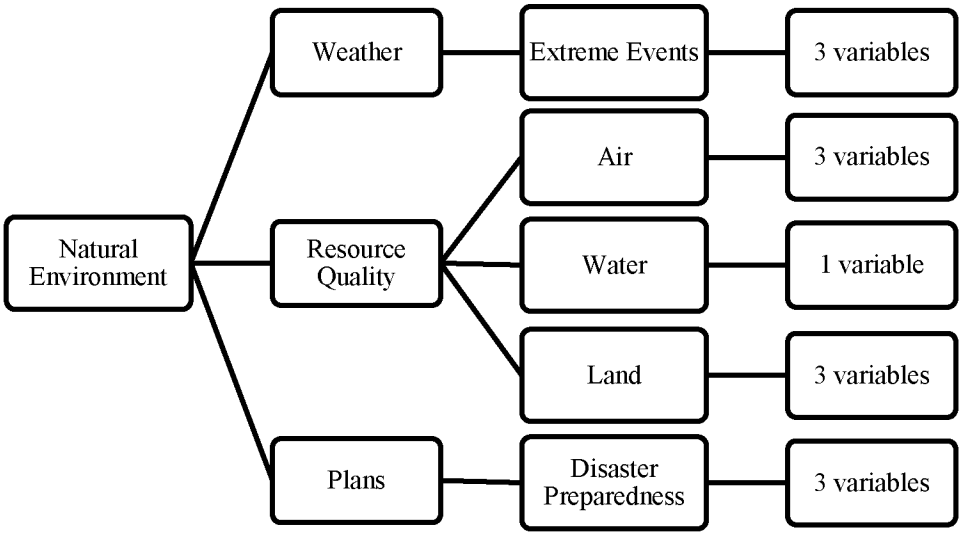


Figure 2.4. Dimensions and Attributes of Environmental Stressors

Table 2.9. Environmental Stressors Variables that may be Associated with Pursuit of Sustainability

Category	Attribute	Variable	Data Source
Natural Environment	Condition	History of extreme weather events	NOAA, Drought monitor, FEMA
		Identified environmental hazardous site(s)	US EPA
		Poor air quality/ pollution issue	US EPA
		Poor water quality or water pollution issue	US EPA
	Plans and policies	Adopted policies/regulations include precautionary or hazard reduction	Government Records

2.6.3.4.1 Storm Events

Identifying extreme weather events presents challenges. The literature defines extreme weather events as those occurrences that are outside (statistically significant) historical averages (NOAA, 2013b). Several data sources were used to identify the occurrence of extreme weather events; these being: NOAA's Storm Data, the National Drought Mitigation Center's Drought Monitor and the Federal Emergency Management Administration's Disaster Declaration Listings.

The record of severe storms and other weather related events for the fourteen sites was obtained by reviewing NOAA's Storm Event Data. NOAA's Storm Event Data "documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce." Storm Data information is gathered from a variety of sources; including: National Weather Service, media, government agencies, private companies, individuals, etc. Although some caution about the data accuracy is warranted, the data does provide a general summary of weather related incidents that are significant in terms of their local intensity even though the incidents may not rise to the level of disasters. For

each event identified within NOAA's Storm Data events database, a review of the event report was made to determine the location and type of event.

2.6.3.4.2 Disaster Declarations

The next environmental variable considered is the number and type of disaster declarations and fire management assistance declarations made by the Federal Emergency Management Agency (FEMA) during the period 2000 through 2012. The data were obtained from FEMA's listing of designated disasters for both the State of Alaska and Oregon. Disaster declarations may include different types of incidents, e.g., a severe storm may include flooding, avalanche, and mudslides; thus, totals may be lower than sum of the number of incidents (FEMA, 2015).

For each disaster identified, a review of the incident report was completed to identify the location and type of incident. Caution is warranted when using FEMA's disaster declarations as some major events do not receive federal disaster declarations and fire management assistance. For instance, the major avalanches that occurred in Juneau in 2008 which destroyed the electrical transmission lines to the area did not receive a federal disaster declaration; indeed, it did not receive a state disaster declaration which is a criterion for federal disaster declaration eligibility. Therefore, incidents may occur within a community that have large local implications yet fail to rise to state or federal declarations. Another inference that may be made from the Juneau 2008 avalanche event is that incidents receiving federal disaster declarations are indeed significant events.

2.6.3.4.3 Drought

Drought is the next environmental variable considered within the Natural Environment category. A drought is considered the loss of precipitation over an extended period of time--usually a season or more--resulting in a water shortage for some activity, group, or environmental sector (National Drought Mitigation Center, 2014). Droughts have direct and indirect effects. Direct effects include crop and livestock losses while indirect effects include higher production costs due to the need to pump from underground aquifers and loss of income may resulting from decreases in food production and increased transportation costs from reduced flows on major river systems such as the Missouri and Mississippi. The drought data reported here is taken from the Drought Monitor Index which "assimilates thousands of bits of data on rainfall, snowpack, streamflow, and other water supply indicators into a comprehensible big picture" (National Drought Mitigation Center). For each site, a rating of more than 25% of the land area within the site was necessary for inclusion. In the vast majority of cases, the data value greatly exceeded 75% of each site's land area. The total number of weeks for the time period 2000 to 2012 is 676 which is the basis used for comparison purposes.

2.6.3.4.4 Air and Water Quality

Air and water quality are two additional variables within the Natural Environment category and indicators of local environmental conditions and community health. Air pollution is a known health hazard and is estimated to kill about 7 million people worldwide and approximately 200,000 early deaths in the United States (Caiazzo, Ashok, Waitz, Yim, & Barrett, 2013). Information on air quality was initially sought from air monitoring stations located within the boundaries of the study's sites; however, few monitoring sites were available and the data collected were not consistent. Instead, air quality data from the United States Environmental Protection Agency's (EPA) National Air Emissions (NAE) inventory 2008 (EPA, 2013c) and 2011 (EPA, 2013d) and EPA's Toxic Release Inventory (EPA, 2015a) were used to estimate the air quality of each site.

The NAE inventory provides estimates of criteria and hazardous air pollutants from all sources. As defined by the EPA, "criteria" air pollutants are air pollutants that are regulated by the use of science-based guidelines (EPA, 2015b). Criteria air pollutants include emissions of carbon monoxide, nitrogen oxides, particulate matter, sulfur dioxide and volatile organic compounds. Hazardous air pollutants, on the other hand, "are those pollutants that are known or suspected to cause cancer or other serious health effects, such as birth defects or adverse environmental effects" (EPA, 2015c). Hazardous air pollutants include chemicals such as dioxin, benzene, toluene, lead, etc.

The NEA inventory data is not available below the county level; therefore, for the cities of Ashland, Milwaukie, and St. Helens county level data is reported and county populations are used to obtain per capita values. The use of county-level data adjusted by using per capita rates assumes that all county residents produce emissions at similar rates. This method is assumed to be appropriate because air pollutants do not respect political boundaries.

Another source of air quality data is EPA's toxic release inventory which provides estimates of hazardous air pollutant emissions (EPA, 2015a). Much of the hazardous air pollutant emissions emanate from facilities handling toxic materials which report their on-site and off-site disposals and releases in EPA's Toxic Release Inventory.

Water quality data is identified by the number of impaired waterbodies as reported by each state to EPA under section 303(d) of the Clean Water Act of 1972, as amended. EPA's 303(d) program requires each state to develop lists of impaired waters; these being, waterbodies for which water pollution controls are insufficient to meet required water quality standards (EPA, 2015f).

The listings for each site were identified by first obtaining EPA's 303(d) Impaired Waters listing for 2004 and 2008 for both Alaska and Oregon (EPA, 2014a, 2014b, 2014c, 2014d, 2014e). Each waterbody was then located by reviewing Alaska maps, or in the case of Oregon, by zip code. No duplicate listings were reported. Reasons reported for impairment included one or more of the

following causes: petroleum hydrocarbons, turbidity, siltation, radiation, dissolved oxygen depletion, metals (e.g., barium, beryllium, copper, iron, etc.), fecal coli form, escherichia coli, and pathogens. Most impaired waterbodies were reported to have more than one of the aforementioned pollutants or conditions. The 303(d) listings identified a variety of sources as causes of the impaired waters with the most often cited being: silviculture (forestry), highway/road/bridge runoff, landfills, mine tailings, placer mining, and unspecified waste.

2.6.3.4.5 Toxic Sites

The next environmental variables considered consist of the number of toxic sites located within the respective sample sites. Toxic sites are defined as any facility or site identified within EPA's Toxic Release Inventory, Superfund listing and Resource Conservation and Recovery Act (RCRA) listing. EPA's listings were used to determine the number of toxic sites located within each of the sample's sites. Toxic sites are recognized for their emissions or for having been contaminated by hazardous materials. It is theorized that populations residing in areas with known hazardous emitters for having contaminated sites are more likely to be sensitive to the related health hazards and more likely to support practices that reduce such pollution with sustainability being one such path.

2.6.3.4.6 Disaster Preparedness

The final environmental variable considered is the treatment of disaster preparedness and hazards mitigation in the planning documents by the local governments. A content analysis was conducted of these documents seeking, among other attributes, how each local government addressed hazards mitigation and disaster resilience. Each documents policies and recommendations as well as implementation actions were reviewed and documented. Of the documents reviewed for each site, five measures were contained in the comprehensive plan, six in the hazards mitigation plan and one in the zoning ordinance.

2.6.3.5 Political Party Affiliation

Another variable that was considered for a relationship between local government and pursuit of sustainability is Political Party Affiliation. Previous studies have shown that political orientation is a major factor in climate change perceptions in the United States (Deryugina, 2013; Egan & Mullin, 2014; Hamilton, 2011; Hamilton & Stampone, 2013; McCright & Dunlap, 2011; McCright, Dunlap & Xiao, 2013; Whitmarsh, 2011). The studies point to the effects of increased political polarization in the United States on the belief that climate change is occurring. The studies also have found that people who identify as Democrats or "lean" Democrat generally believe that climate change is real

while those who identify as Republican or "lean" Republican do not believe that climate change is real. A study by Hamilton (2011) also found that concern about climate change among Democrats increased with education while concern about climate change decreased with education among Republicans; suggesting that party affiliation is a strong factor. Since the rationale for pursuing sustainability is often related to climate change, in other words, as a means of mitigating or reducing climate effects, this study explored the role, if any, that political party affiliation might have in pursuit of sustainability. Figure 2.5 and Table 2.10 illustrate the dimensions and variables for the variable category Political Party Affiliation.

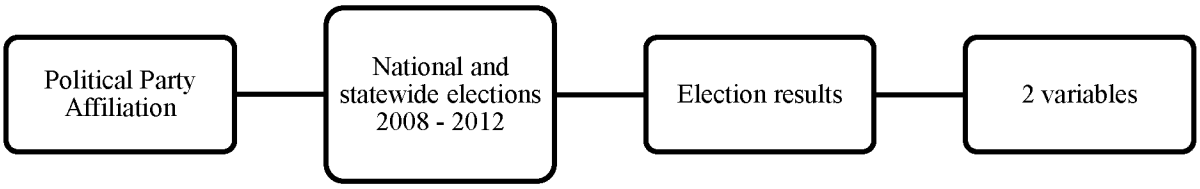


Figure 2.5. Dimension and Attributes of Political Party Affiliation

Table 2.10. Political Party Affiliation Variables that may be Associated with Pursuit of Sustainability

Category	Attribute	Variable	Data Source
Political Party Affiliation	Voting Behavior	Votes cast in Presidential, gubernatorial and federal senate elections: 2008 - 2012	Government Records

The method employed for considering a potential relationship between pursuit of sustainability at the study's sites and political party affiliation consisted of reviewing election results for major political offices during the period 2008 through 2010. Both Alaska and Oregon voters went to the polls during this time period to vote for the offices of: U.S. President (twice), state governor, and for each of the state's two U.S. Senators.

2.6.3.6 New Political Culture

"New Political Culture" is an index developed by Saha (2009a) that measures the receptivity of a community to new initiatives and thus, whether a community is more receptive to pursuit of sustainability. The dimensions and variables associated with New Political Culture are illustrated in Figure 2.6 and Table 2.11. The index is comprised of standardized scores of six demographic variables: percentage of unmarried and non-traditional households, percentage of population between

the ages of 18 and 44 (the ACS category is 20-44), percentage of population aged 25 years or more with a Bachelor's degree, percentage of female participation in the labor force, and percentage of the labor force in the professional, scientific, technical, education occupations. Saha found that local governments with positive measures of New Political Culture had a positive relationship with pursuit of sustainability. The New Political Culture index was tested here to determine if it there is a relationship with site's meeting the definition of a sustainable site.

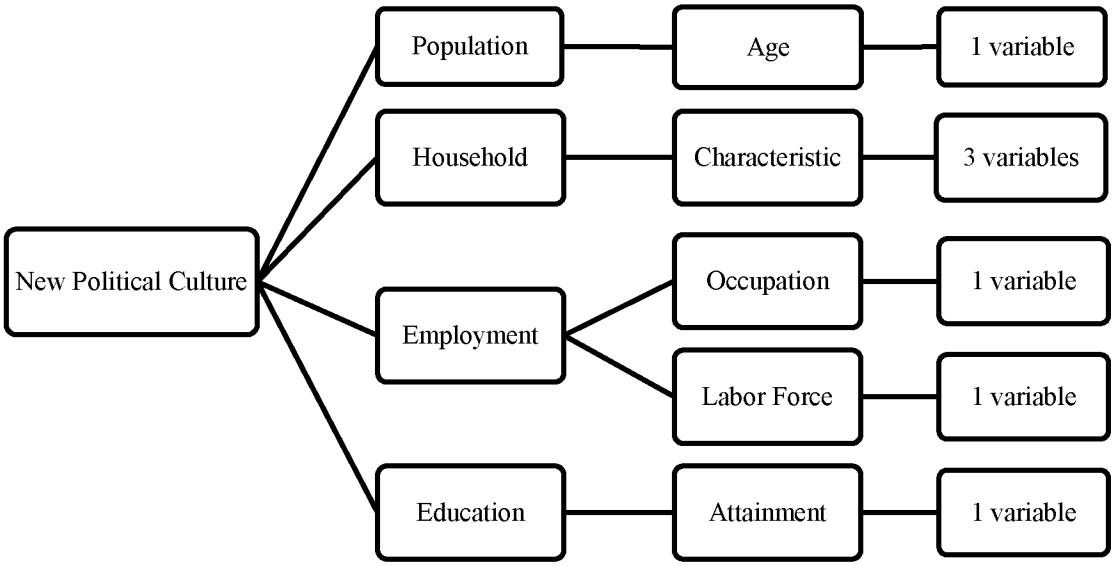


Figure 2.6. Dimensions and Attributes of New Political Culture

Table 2.11. New Political Culture Variables that may be Associated with Pursuit of Sustainability

Category	Attribute	Variable	Data Source
New Political Culture	Population characteristics	Non-traditional households	US Census ACS 08-12
		Population 20-44 years of age	US Census ACS 08-12
		Population 25 years of age or more w/ Bachelor's degree or higher	US Census ACS 08-12
		Female labor force participation	US Census ACS 08-12
		Professional, technical, scientific and education occupations	US Census ACS 08-12

2.6.3.7 Community Well-Being

This study also hypothesizes that a community's well-being is related to a local government's pursuit of sustainability. Community well-being has many definitions that share common themes; these being: a state of existence where material needs are met, where individuals and groups can act to fulfill their goals and basic life satisfaction (Gallup, Inc., & Healthways, Inc., 2014; Hajkowicz et al., 2011; McCrea et al., 2014; Ribova, 2000; Tonts et al., 2012). The idea that community well-being may be related to a local government's pursuit of sustainability is based on Maslow's hierarchy of needs (1943) which contends that basic human needs such as security, shelter, and food must first be satisfied before individuals aspire to higher levels of needs such as self-actualization. At the community level, Maslow's theory suggests that a community must have basic level socio-economic needs such as housing, safety, employment and health care and a significant amount of wealth or affluence for it to consider higher level needs such as moving forward with sustainability programs and practices. My theory is that for a local government to move forward with sustainability efforts, the basic community needs must be met for the majority of its population and that the population must also consist of a sufficient amount of wealth or affluence. An extension of my theory is that local governments serving communities with low measures of community well-being will focus their resources on addressing basic socio-economic needs rather than on a higher need such as sustainability.

Previous research has used the socio-economic view of community well-being to acquire an understanding of community well-being (Hajkowicz et al., 2011; Ribova, 2000; Tonts et al., 2012). This study measures a community's well-being along six dimensions: health, crime, wealth, household, and education, (Figure 2.7). The variables and data sources associated for each dimension of community well-being is described in Table 2.12.

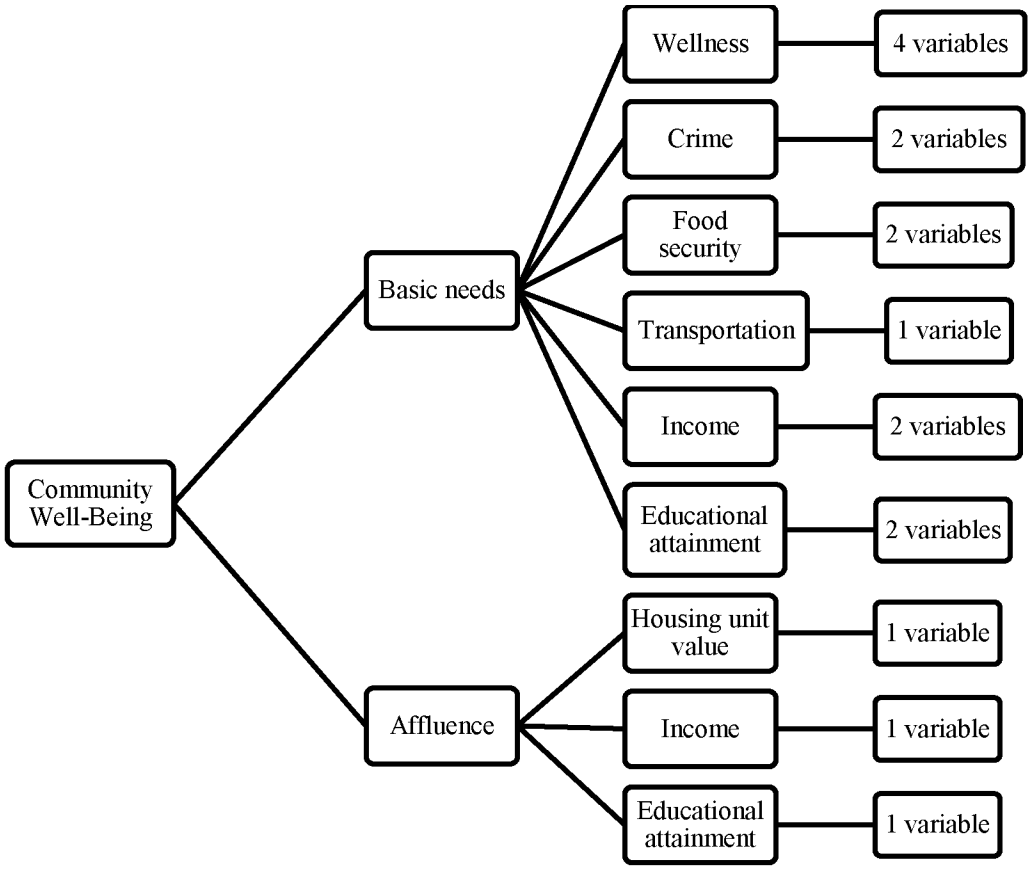


Figure 2.7. Dimensions and Attributes of Community Well-Being

Table 2.12. Community Well-Being Variables that may be Associated with Pursuit of Sustainability

Category	Attribute	Variable	Data Source
Community Well -Being	Basic Needs	Less than 9th grade and 9th-12th grade, no diploma	US Census ACS 08-12
		Owner – Median household value	US Census ACS 08-12
		Low access to food – children and seniors at one mile	USDA Food Access Database
		Low access to food – people at poverty at one mile	USDA Food Access Database
		Food stamps and SNAP participation	US Census ACS 08-12
		Households without an automobile	US Census ACS 08-12
		Violent crime rate	State (FBI) Crime Reports
		Property crime rate	State (FBI) Crime Reports
		No health insurance	US Census ACS 08-12
		Death from intentional self-harm (suicide)	State Vital Statistics
		Death from alcohol	State Vital Statistics
	Affluence	Income 5 times greater than poverty level	US Census ACS 08-12
		Housing Unit value	US Census ACS 08-12
		Bachelor's degree or higher	US Census ACS 08-12

Variables related to health consist of death rates associated with unhealthy and unsafe living practices; these being, alcohol consumption and suicide. Other health related variables provide a glimpse of a community's need for, and ability to address, health care needs. For instance, the percent of population with disabilities that is without access to health insurance.

Three measures seek to portray each site's economic condition by considering poverty, and income. The amount of each site's population living in poverty and having an income to poverty ratio of five (5) or greater provides measures on poverty and wealth. Levels of educational attainment are also considered to measure a site's ability to compete in today's economy. In many cases, a community's level of educational attainment is a variable used by firms in their locational decisions. The education attainment variables consider included: the percentage of each site's population that lacks a high school diploma and the percentage of the population having a Bachelor's degree or higher. Lastly, a site's owner median housing unit value and availability of automobiles are used to portray access to affordable housing and access to transportation or mobility. In addition, owner median housing unit value is also a measure of a site's wealth, as housing represents, for most citizens, a major portion of their life investment.

Violent and property crime rates provide an understanding of how safe a community is. Violent crime is composed of: aggravated assault, murder, rape, and robbery. Property crime is composed of: burglary, motor vehicle theft and larceny-theft. A site with higher crime rates may be devoting a higher percentage of its local government resources to crime prevention rather than other priorities such as sustainability.

The ability to access food is also believed to be an important factor in community well-being. Those living in areas of food deserts and areas where healthy foods are not readily available are likely to have higher rates of obesity and diabetes and other health challenges as well as reduced educational performance for young students. Moreover, access to food may be especially challenging for those living in poverty or having an age dependency. Three measures are used to gauge each site's food security characteristics: low access to food of age dependent (children and seniors) within one mile of residence, low access to food for low income within one mile of residence and those participating in the federal food stamp and supplementary nutrition assistance program (SNAP).

The Community Well-Being category was split into 2 subcategories to determine if there might be a difference in how a community's level of basic needs and affluence influences their pursuit of sustainability.

2.7 Evaluation of Method

There are four questions that any qualitative methodology must take into account according to Katz (1983, 127). The four questions address: representativeness, reactivity, reliability, and replicability. The following paragraphs discuss these four questions as they pertain to this study.

2.7.1 Representativeness

Representativeness refers to whether a study's results can be generalized to the entire population under study. In qualitative studies, Katz (1983, p 134) defines representativeness as a search for negative cases where negative cases are those in which the results contradict a theory: "the more differences discovered within the data, the greater the number of possible negative cases, and thus the more broadly valid the resulting theory." In essence, if the possibility of a large number of negative cases exists, but few are found, then the theory remains tenable. In other words, the more cases examined without finding contradictory, or "negative," results, the more reliable and representative the theory.

Can the results of this study be generalized to the entire population of local governments in the United States? The short answer is—not yet, more research is necessary. This study looked at fourteen cases, not the several thousand local governments that exist. This study's purpose was exploratory in nature. The study's intent was to discover what categories of variables might be associated with local government pursuit of sustainability and determine if the results found by others studying large local governments might be replicated at the small local government level so that further examination may take place. Therefore, analysis of many cases was sacrificed in order to probe more deeply into the fourteen cases for what categories of variables and relationships might be of importance. The next step in this research is to look for negative cases that could alter the emerging theory.

2.7.2 Reactivity

Reactivity considers the effects the observer or instrument may have on the observation and can be expected when the process is a stimulus to change rather than a passive record of behavior (Campbell & Stanley, 1963. p.9). In this study, information and data were collected on past behaviors and conditions. For example, the study sought evidence on whether the local governing body adopted ordinances and resolutions revealing an interest in the pursuit of sustainability. Similarly, interview questions were asked that referred to activities that may or may not have taken place; such as whether or not energy audits had been completed. Thus questions and data were collected addressing events that had taken place in the past and thus not subject to change. Moreover, historical data, obtained

from government databases, were used to understand a community's population, economic, and natural environmental conditions. Therefore, the nature of the study's data collection methods limited reactivity effects.

2.7.3 Reliability and Replicability

Reliability means that the information collected and its interpretation are accurate and that disconfirming data have not been overlooked. To accomplish this, I made a concerted effort to develop indicators that were objective rather than subjective and I made a point of looking for information at every step along the way that could disprove my hypothesis. Additionally, I proceeded as recommended by Katz (1983) and dutifully searched for differences in data and negative cases.

I also completed a pilot study to test and refine the instruments and methods prior to beginning research on the actual cases. The results of the pilot study caused me to make several revisions in order to enhance reliability. The two scorecards were refined to make each variable easily scorable and objective. I also tested the availability of the data I hoped to use to ensure that I would be able to use triangulation as a means of strengthening validity.

I developed, a complex definition of what constitutes a "local government pursuing sustainability" as a means of creating an objective standard involving a host of measureable variables. Likewise, the explanatory variables were measured using many objective, scorable criteria that are outlined in detail in my results chapter. Others should be able to follow the same scoring protocol for the same variables for the same sites and get the same results. In addition, my content analysis was based on previous research on plan evaluation which used an objective coding scheme requiring little interpretation; i.e. it used "manifest content" that was readily observable, such as the presence of a particular word in a written text (e.g., the word sustainability) as opposed to latent content which focuses on the meaning underlying the elements of a message. Thus, "if the locus of the meaning is contained in a discrete element of the content, then, the content is manifest. If the locus of meaning is in the content but must be inferred by recognizing a pattern across elements, then this is the pattern form of latent content" (Potter & Levine−Donnerstein, 1999, p261).

In the majority of instances, for both the scorecard and content analysis, the decisions I made were binary in nature and thus maximize the potential for other researchers to verify my results and/or use the same methods in other studies of local government and pursuit of sustainability.

Other steps were taken to maximize the reliability of the information. I used documents such as budgets, audits and election results as well as data from various government databases, e.g., US Census, EPA's Toxic Release Inventory and FEMA's Disaster Declarations—all of which follow

agreed-upon uniform standards for data collection and reporting. This action allowed comparisons of the cases in the study and this method is replicable to other local governments in the United States.

Recordings and verbatim transcripts were made of all interviews so that others can verify my interpretations of those results. However, as it turned out, the interviews and questionnaires did not provide as much useful information as I had hoped. Instead, I obtained the majority of the data from government documents and government databases, almost all of which have uniform data collection and reporting standards.

Chapter 3 Results

3.0 Introduction

A brief description of the how the variables were scored and ranked leads this chapter. The results of the response variable is then presented with separate sections on the content analysis and scorecards. Following the results of the response variable are the results of the explanatory variables. A comparison of each case's response variable and explanatory variable results is also provided.

3.1 Scoring and Ranking

Many of the variables measured in this study have different scales; the most common being counts, percentages and rates. In order to compare the sites to one another, the data were standardized. The use of standardized scores, Z-scores, is a common technique for comparing variables measured in different scales. For example, Florida (2005) used the technique in his study of cities and the creative class, Saha (2009b) used the technique to develop her measure of New Political Culture when studying local government and pursuit of sustainability and the University of Wisconsin (2014) uses the technique to combine measures of health in their annual County Health Rankings.

As described by University of Wisconsin, "standardizing the various measures transforms them to the same metric – a mean having a value of 0 and a standard deviation of 1." This method thus allows different measures, such air quality and water quality, to be compared. The method also allows the construction of indices which are merely the average of the Z-scores of each variable within category; thereby providing a means to compare one site with another. The standardization formula is depicted in Figure 3.1.

$$\text{Z-score} = \frac{\text{City or County Value} - \text{Sample Mean}}{\text{Standard Deviation of All City and County Values}}$$

Figure 3.1. Standardization Formula (Z-score)

A site's standardized score or Z-score is relative to the other sites in the study and is not comparable to state or national values. Unless otherwise noted, a positive score indicates a value higher than the average for all sites while a negative Z-score indicates a lower than average value for the site when compared to the average for all sites.

In some cases, reverse coding was used during the calculation phase to ensure that the Z-scores represent similar values. For example, a high Z-score for the percentage of the population living *below* poverty is a less desirable condition and is therefore multiplied by -1 so that it may be compared readily to positive scores that represent desirable qualities such as a high level of education attained.

The Z-scores are summed and then averaged by the number of variables considered to yield a composite score or index for the particular attribute under consideration. As an example, the variable category "community well-being" is comprised of sixteen variables' Z-scores. This is the method used throughout the study to compare and contrast the various local governments.

3.2 Results: Response Variable

3.2.1 Content Analysis Results

The analysis indicates that the study's fourteen local governments are making limited use of the comprehensive plan, hazards mitigation plan and zoning ordinance to pursue sustainability, address climate change and enhance disaster resilience. I found the terms sustainability, climate change, and resilience in only two of the comprehensive plans. The others made no mention of these terms. In addition, none of the plans' assumptions about the future contained references to sustainability, climate change, or resilience. Moreover, none of the plans included a recommendation for developing a separate sustainability or climate action plan.

Table 3.1 presents the overall findings of the content analysis which is the compilation of scores for the three planning documents: comprehensive plan, zoning ordinance and hazards mitigation plan. As the maximum score possible for any category is 2.0, the overall mean score of 0.63 and corresponding high score of 0.94 indicates that less than half of the elements within the documents speak about sustainability and climate change. The Oregon local governments had a higher score (0.70) than the Alaska counterparts (0.52). This might suggest that sustainability and climate change statements are somewhat more likely to be found in Oregonian planning documents than Alaskan. Further research of a larger number of planning documents is needed to confirm this exploratory finding.

The scores reported in Table 3.1 also reveal which topic categories are most associated with sustainability and climate change statements as well as differences in how often the local governments study sites mention the topic categories. The two traditional components of comprehensive planning—land use and transportation—have the most association with statements and practices about sustainability and climate change. The land use category has the highest score of

any category with a mean of 0.91 (out of a possible 2.0) for both Oregon and Alaska sites. The transportation category has the second highest overall mean score, 0.84.

Table 3.1. Indices for Sustainability, Climate Change and Disaster Resilience in the Three Planning Documents Analyzed

Category	Mean	Min	Max	Number of Items Within Category
Overall				
AK & OR sites	0.63	0.35	0.94	81
Combined*				
Alaska sites	0.52	0.35	0.94	
Oregon sites	0.70	0.56	0.86	
Goals				
Combined *	0.34	0	1.6	5
Alaska sites	0.27	0	1.6	
Oregon sites	0.40	0	0.80	
Plan Process				
Combined	0.57	0	1.20	5
Alaska sites	0.60	0	1.2	
Oregon sites	0.55	0	1.2	
Land use				
Combined	0.91	0.38	1.38	21
Alaska sites	0.71	0.38	1.33	
Oregon sites	1.06	0.76	1.38	
Economy				
Combined	0.52	0	1	6
Alaska sites	0.67	0	1	
Oregon sites	0.42	0	0.67	
Conservation				
Combined	0.51	0	1.08	12
Alaska sites	0.31	0	0.67	
Oregon sites	0.67	0.25	1.08	
Disaster Resilience				
Combined	0.45	0	0.70	10
Alaska sites	0.33	0	0.60	
Oregon sites	0.54	0.40	0.70	
Housing				
Combined	0.48	0	1.25	4
Alaska sites	0.42	0	1	
Oregon sites	0.53	0	1.25	
Health & Safety				
Combined	0.71	0	1.2	10
Alaska sites	0.63	0	1	
Oregon sites	0.76	0.30	1.20	
Food security				
Combined	0.21	0	1	4
Alaska sites	0.25	0	1	
Oregon sites	0.19	0	0.25	
Transportation				
Combined	0.84	0	2	4
Alaska sites	0.79	0	2	
Oregon sites	0.88	0	1.5	

* In this Table, "Combined" always means Alaska and Oregon sites combined

Local governments in Oregon have higher mean scores for land use and transportation; these being 1.06 and 0.88, respectively while Alaska's local governments' mean scores are 0.71 and 0.79, respectively. The next highest category is health and safety with a combined mean score of 0.71. Most of the points scored in the health and safety category are related to air and water quality and noise and light pollution. Several of the categories have very low scores such as food security (mean score = 0.21). No plan addressed crime or public health. Practices addressing livable wages, poverty and low income issues are also missing from the documents.

The results of the content analysis indicate that of the fourteen sites, Juneau has the highest number of sustainability-related measures within its comprehensive plan (Table 3.2). Juneau scored high in areas of goal statements that contain the words sustainability and/or climate change within both comprehensive and hazards mitigation plans. Because comprehensive plans are adopted by ordinance, they represent the official position of the local government. This is another indication of Juneau's use of formal adoption methods related to sustainability programs and practices. Juneau also received the highest scores of all the cases for planning document elements addressing sustainability, climate change and disaster resilience in the land use, transportation, and economy elements.

Table 3.2. Comprehensive Plan Scoring Results (Arranged from highest to lowest total)*

Plan category	Juneau	Hood River	Milwaukie	Ashland	Clatsop	Sitka	Ketchikan	Kodiak	Fairbanks	Columbia	Crook	Tillamook	Kenai	St Helens	Average
Conservation	6	6	5	7	6	3	3	4	4	4	3	1	0	4	4.0
Disaster resilience	4	6	5	2	3	0	1	6	5	4	6	6	4	1	3.8
Economy	6	2	2	4	4	4	6	2	3	1	3	0	3	4	3.1
Food security	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0.1
Goals/policies	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0.4
Health and Safety	6	9	6	6	6	9	4	4	4	5	5	4	5	0	5.2
Housing	2	0	2	0	1	2	2	1	1	0	0	0	0	1	0.9
Land use	7	8	6	8	7	6	5	3	2	6	5	4	3	6	5.4
Sustainability/ climate change	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Transportation	4	4	3	3	3	2	2	2	4	0	2	4	0	0	2.4
Plan process	2	2	2	4	0	0	4	4	0	2	0	2	4	0	1.9
Public participation	2	2	4	2	2	3	2	1	1	2	0	2	3	1	1.9
Total	43	39	37	36	32	30	29	27	25	24	24	23	22	17	29.1

*Scores represent the number of plan recommendations made for the identified categories

Ashland and Hood River County also have high scores; although Ashland was the only one to have a goal statement referring to climate change within its plan documents; this being Ashland's All Hazards Plan. The high scores for these two local governments are due to inclusion of practices

related to sustainability and disaster resilience within the land use, transportation, and health and safety elements of their three planning documents. Even though Ashland has ample evidence of the use of formal adoption methods, the city's primary planning documents do not contain specific references to the topics. Ashland, as well as the other Oregon sites, benefited from Oregon's planning statutes that provide guidance on two required categories – conservation and land use. In addition, Ashland's health and safety measures which address air and water quality, noise pollution, etc., was another category where points were scored. Hood River, the third highest ranking site in terms of sustainability score, is similar to Ashland in its scores. At the other end of the scale, the sites with the lowest scores had fewer sustainability-related measures in the categories of goals/policies, conservation, economy and land use.

The zoning ordinance is the principle means used by local governments to implement the comprehensive plan. The zoning ordinance is also a local government's primary land use regulation. As such, the use of sustainability measures within the zoning ordinance is a way of directly implementing sustainability measures; thus it is probably the strongest indication of a community's commitment to sustainability. The results of the content analysis for the zoning ordinance show that Ashland has the highest score (Table 3.3). Ashland's high score is based upon high ratings in the land use, conservation and health and safety categories; categories where sustainability measures may strongly influence the community's development. The strong showing of Ashland in the zoning category supports its high ranking as a site that has formally adopted and implemented sustainability measures as identified in its Sustainability Score (discussed more fully below).

Table 3.3. Zoning Documents Scoring Results (Arranged from highest to lowest total)

Plan category	Ashland	St Helens	Milwaukie	Juneau	Clatsop	Hood River	Crook	Columbia	Tillamook	Fairbanks	Sitka	Kodiak	Kenai	Ketchikan	Average
Conservation	6	3	5	2	2	0	4	0	2	0	0	0	0	0	1.7
Disaster resilience	2	2	0	0	2	0	1	0	0	0	0	0	0	0	0.5
Food security	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0.6
Health and Safety	5	3	2	2	2	3	2	2	1	1	1	2	0	0	1.9
Housing	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2
Land use	12	11	11	11	10	11	9	10	8	8	7	3	5	3	8.5
Transportation	0	2	2	4	2	2	1	0	0	1	0	0	0	0	1.0
Total	27	22	20	19	19	18	18	13	12	11	9	5	5	3	14.4

Following Ashland in the zoning scoring is St Helens which is a surprising result as St Helens has a low score for its comprehensive plan and also has one of the lowest Sustainability Scores. The

high result for St Helens is due to its zoning measures which contain sustainability related measures. St Helens is an example of a local government that has a strong tool at its disposal to effectuate sustainability, yet does not do so. A possible reason that St Helens may not be using its available zoning measures to implement sustainability measures is that its comprehensive plan does not provide the necessary guidance through its goals, policies and recommendations, to do so. The weakest zoning measures are all found in Alaska's sites, with the sole exception of Juneau which ranks fourth. The five Alaska sites of Fairbanks, Kenai, Ketchikan, Kodiak and Sitka, have few sustainability-related zoning measures addressing conservation, economy, health and safety and land use. The zoning document scores of these five Alaska sites reflect their low Sustainability Scores.

Hazards mitigation plans describe the actions local governments will take in the event of a natural or human caused disaster such as an earthquake or oil refinery explosion. The federal government requires these plans in order to qualify for disaster relief. The hazards mitigation plan also describes the future oriented measures that the local government will take in order to reduce exposure and mitigate the effects of a disaster, such as modifying the zoning ordinance to limit development in flood prone areas. Sustainability, especially sustainable development, provides means for disaster mitigation and building community resilience by encouraging development that incorporates the potential for extreme weather and disasters into design and location decisions.

Juneau and Ashland have markedly different content analysis scores for sustainability measures within their hazards mitigation plans (Table 3.4). Juneau has the highest score for all sites while Ashland is ranked ninth. The major differences between the two are the number of sustainability related measures in the land use and goals/policies categories. St Helens and Hood River have the second and third highest scores, respectively and may be due to their past experiences with riverine flooding.

Table 3.4. Hazards Mitigation Plan Scoring Results (Arranged from highest to lowest total)

Plan category	Juneau	St Helens	Hood River	Clatsop	Tillamook	Columbia	Crook	Fairbanks	Ashland	Milwaukie	Kodiak	Sitka	Kenai	Ketchikan	Average
Conservation	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0.4
Food security	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.1
Goals/policies	4	2	2	2	4	2	6	2	4	2	2	0	0	0	2.3
Infrastructure	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0.2
Land use	10	12	6	4	8	8	2	6	4	2	2	4	4	0	5.1
Plan process	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Vulnerable population	2	0	2	4	0	0	2	0	0	2	0	0	0	0	0.9
Total	16	15	14	12	12	11	10	10	9	6	4	4	4	0	9.1

Four Alaska sites, Sitka, Kodiak, Kenai and Ketchikan have the lowest scores for sustainability measures within its hazards mitigation plan with low scores in the land use and goals/policies categories.

The combined content analysis scores for the sites' three planning documents are presented in Table 3.5. Juneau and Ashland, have the highest scores overall all with each demonstrating high scores in the categories of conservation, health and safety and especially land use. Hood River and Milwaukie place third and fourth respectively with lower scores in the land use category. The lowest combined scores are found in the five Alaska sites, all sites with low scores in the conservation and land use categories.

Table 3.5. Content Analysis Results for the Three Planning Documents Combined

Category	Juneau	Ashland	Hood River	Milwaukie	Clatsop	St Helens	Crook	Columbia	Tillamook	Fairbanks	Sitka	Kodiak	Ketchikan	Kenai	Average
Conservation	8	13	10	10	10	7	7	4	3	4	3	4	3	0	6.1
Disaster resilience	4	5	6	5	5	3	7	5	6	5	0	6	1	4	4.4
Economy	6	4	2	2	4	4	3	1	0	3	4	2	6	3	3.1
Food security	0	0	1	0	1	1	1	1	1	4	2	0	0	0	0.9
Goals/policies	8	4	2	4	2	2	6	2	4	2	0	2	0	0	2.7
Health and Safety	8	11	12	8	8	3	7	7	5	5	10	6	4	5	7.1
Housing	2	2	1	2	1	1	0	0	0	1	2	1	2	0	1.1
Infrastructure	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1
Land use	28	24	25	19	21	29	16	24	20	16	17	8	8	12	19.1
Plan process	2	4	2	2	0	0	0	2	2	0	0	4	4	4	1.9
Public participation	2	2	2	4	2	1	0	2	2	1	3	1	2	3	1.9
Sustainability/ climate change	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Transportation	8	3	6	5	5	2	3	0	4	5	2	2	2	0	3.4
Vulnerable population	2	0	2	2	4	0	2	0	0	0	0	0	0	0	0.9
Total	78	72	71	63	63	54	52	48	47	46	43	36	32	31	52.6

We now turn to the discussion of the other method used to evaluate the pursuit of sustainability by the fourteen local governments - sustainability scores. As will be explained below, the results of the content analysis are used as one component in computing the sustainability score for each case.

3.2.2 Scorecard Results

Table 3.6 illustrates the raw scores obtained for each site from scorecard 1. The local governments of the Juneau and Ashland stand out from the other twelve cases as both have much higher values. Both Juneau and Ashland exhibit strong evidence of both formal adoption methods (e.g., adopted ordinances, resolutions, and plans; budget and personnel support, and established sustainability commissions) and informal adoption methods (e.g., policies and efforts that are not recognized by governing body measures) that are directly related to the adoption and implementation of sustainability programs and practices. The remaining cases provide much less evidence of formal or informal efforts. Of this group only Sitka and Milwaukie have some evidence of formal measures; that being, an adopted climate action plan in Sitka's case and for Milwaukie, an adopted transportation plan with a policy goal calling for sustainable transport related practices. Hood River, on the other hand, has a relatively high level of informal measures supporting sustainability; for instance, the county is exploring bio-mass energy production, manages its own forest within sustainable guidelines and is supporting community-based efforts to recycle waste food and agricultural waste in addition to the traditional paper and aluminum waste recycling.

The twelve cases having few formal adoption measures also demonstrate less interest in sustainability as measured by the number of pillars addressed, their monitoring efforts, and budgetary and personnel support. This twelve member group almost exclusively focuses on the energy related pillar of sustainability. For example, most of this group's members have completed energy audits of their facilities, installed more efficient lighting and equipment and are also either installing or presently using renewable energy sources such as solar, bio-mass, wind and hydro.

Another difference among the sites is the use of performance measures. Performance measures are metrics used to determine a program's efficiency and/or effectiveness. The majority of cases fail to use performance measures to monitor their efforts as evidenced by their budget and audit documents. The budget and personnel support are also examples of differences. In the case of Juneau and Ashland, the budget supports programs and practices that are directly related to sustainability efforts. The other twelve cases earn points in this category primarily because their budgets support energy audits; other energy efficiency related upgrades and continued use of renewable energy sources. Finally, most cases failed to support sustainability efforts through budgetary support and personnel explicitly dedicated to sustainability.

Table 3.6. Scorecard #1 Results: Methods Used to Implement Sustainability

Attribute	**Possible Points**	Juneau	Ashland	Hood River	Milwaukie	C& Sitka	Clatsop	Crook	Kenai	Ketchikan	Kodiak	Columbia	Fairbanks	Tillamook	St Helens
Adoption Method[1]															
Formal	**4**	4	4	-	2	2	-	-	-	-	-	-	-	-	-
Informal	**4**	-	-	3	-	1	1	1	1	2	1	1	1	1	-
Pillars of Sustainability[2]	**4**	4	4	2	1	2	1	1	1	2	2	1	1	1	1
Implementation Effort[3]	**3**	3	3	2	1	1	1	2	1	1	1	1	1	1	1
Monitoring Effort[4]	**3**	3	3	0	3	0	3	1	3	0	0	0	0	0	0
Focus Areas Addressed[5]	**3**	3	3	2	2	2	2	2	1	2	3	2	1	1	1
Fiscal Support[6]	**9**	9	9	3	3	3	3	3	3	3	3	3	3	3	3
Sustainability Organization[7]	**1**	1	1	1	1	1	0	0	1	0	0	0	1	0	0
Collaborative efforts[8]	**2**	2	2	1	1	1	1	2	1	1	1	2	1	1	1
Use of best practices[9]	**1**	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Total	**30**	30	30	15	14	13	12	12	12	11	11	9	9	8	7

Note: 1-Adoption methods may be of two kinds, formal or informal but points are awarded for only one method. Formal adoption methods consists of actions approved by the local government's governing body such as an ordinance, adopted plan, or resolution. An informal method consists of a plan, policy, or directive not approved by the governing body; such actions are typically administrative in nature.

2-The pillars of sustainability refer to economy, environment, equity, food security and governance.

3-Implementation effort refers to the level of work effort being made to implement the actions formally or informally approved.

4-Monitoring refers to the use of targets, indicators, performance measures to track progress.

5-Number of focus areas addressed refers to the possible program or practices and the related pillar of sustainability (e.g., air quality is a focus area of the environmental pillar; affordable housing is a focus area of the equity pillar).

6-Fiscal support refers to whether or not funds and/or personnel have been budgeted to support the local government's sustainability efforts.

7-A dummy variable, 0 for no community-based sustainability organization in area, 1 for yes.

8-Evidence of regular collaboration with other agencies on sustainability and/or resource management matters.

9A dummy variable, 0 for no evidence of use of sustainability best practices and 1 for yes.

Table 3.7. Scorecard #2 Results: Comprehensiveness of Sustainability Efforts

Sustainability Efforts	**Possible Points**	Juneau	Ashland	Hood River	Crook	Milwaukie	Ketchikan	Kodiak	Columbia	Sitka	Fairbanks	Clatsop	Tillamook	Kenai	St Helens
Internal Recycling	**1**	1	1	1	1	1	1	1	1	1	1	1	1	1	0
External Recycling	**1**	1	1	1	1	1	1	1	1	1	1	0	1	1	0
New Building Design & Construction	**4**	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Building Operations & Maintenance	**5**	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Greenhouse Gas Emissions Inventory	**1**	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Greenhouse Gas Emissions Reduction	**5**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Building Energy Consumption	**2**	2	2	2	1	1	1	1	0	0	1	1	1	1	1
Renewable Energy Use	**3**	1	2	2	2	1	2	2	1	2	0	1	0	0	1
Environmental Purchasing Program	**1**	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Municipal Fleet	**1**	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Employee Modal Split	**3**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction/ Demolition Waste Diversion	**1**	1	0	0	1	0	0	0	1	0	0	0	0	0	0
Hazardous Waste Separation & Handling	**1**	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water Conservation	**2**	0	2	2	1	2	0	0	0	0	0	0	0	0	0
Stormwater Mgt.	**1**	1	1	1	1	1	0	0	1	0	0	1	1	0	1
Comprehensive Plan	**2**	2	2	1	1	1	1	1	1	1	1	1	1	1	1
Sustainability Plan	**3**	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Climate Plan	**3**	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Sustainability Com.	**1**	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Sustainability Officer	**2**	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Sustainability in New Employee Orientation	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sustainability Recognition Program	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**46**	**23**	**23**	**11**	**10**	**9**	**7**	**7**	**7**	**6**	**6**	**6**	**6**	**5**	**5**

With an understanding of the level of formal or informal support for sustainability efforts, we turn to the level of effort undertaken by the local governments' pursuit of sustainability. Understanding the level of effort allows a determination of whether the local government is "saying all of the right things" as well as "doing them." The level of effort is measured by reviewing the types of programs

and practices undertaken and rating the effort made by each local government to achieve sustainability. Scorecard 2 was used to measure this level of effort and the results are depicted in Table 3.7.

The results of scorecard one are reaffirmed by scorecard two in terms of there being only two local governments in the sample actively pursuing sustainability related programs and practices. Once again, the purpose of the scorecards is to determine whether or not local governments are pursuing sustainability efforts, and if so, how.

To compute the overall sustainability scores, the results of the content analysis, scorecard one and scorecard two were added to one another and standardized. The results, presented in Table 3.8, indicate that two local governments, Juneau and Ashland, received the highest number of possible points and as such, have the highest ranking scores of the 14 sites. Juneau and Ashland achieved scores above seventy-five percent (75%) of the total points available indicating above average sustainability effort. Juneau and Ashland both have scores close to two standard deviations above the mean. The scores for the remaining sites are below seventy-five percent (75%) of the total available. Moreover, the scores earned by Juneau and Ashland for the two scorecards which provide more comprehensive measurement of sustainability efforts, are more than half of that earned by the remaining sites. Therefore, of the fourteen sites, only Juneau and Ashland meet the definition of a sustainable site.

Table 3.8. Overall Sustainability Score

Local Government	Content Analysis Score	Scorecard 1 Score	Scorecard 2 Score	Points Scored	Percent of Total Points Available	Sustainability Score Z-Score (Standardized Score)
Juneau	78	30	23	131	85%	2.12
Ashland	72	30	23	125	81%	1.89
Hood River	71	15	14	97	63%	0.81
Milwaukie	63	14	9	86	56%	0.39
Clatsop	63	12	10	81	53%	0.20
Crook	52	12	10	74	48%	-0.07
St Helens	54	7	5	66	43%	-0.38
Sitka	43	13	9	65	42%	-0.42
Columbia	48	9	7	64	42%	-0.46
Fairbanks	46	9	6	61	40%	-0.58
Tillamook	47	8	6	61	40%	-0.58
Kodiak	36	11	7	54	35%	-0.84
Ketchikan	32	11	7	50	32%	-1.00
Kenai	31	12	5	48	31%	-1.08

3.2.3 Summary of Response Variable Results

The results of the content analysis and scorecards have determined that Juneau and Ashland meet the definition of sustainable sites. Both Juneau and Ashland are pursuing sustainability in a variety of ways and are doing so in a formal manner. For example, both have evidence of actions adopted by the governing body, they have created advisory bodies to assist on sustainability efforts have implemented sustainability efforts and include budgetary support. While the other sites do perform sustainability-related efforts to varying degrees, they do not undertake these efforts with a formal goal of achieving sustainability. Once again, formal goals are important because they provide legal and political standing for pursuing sustainability efforts. And as stated earlier, informal methods alone are easily changed by the next administration and thus do not represent a long-term commitment to sustainability. Knowing which of the fourteen cases pursue sustainability and those that do not allow the exploration of those variables that may be associated with local government pursuit of sustainability. The variables that were considered in this study are discussed next, in Chapter 5.

3.3 Results: Explanatory Variables

3.3.1 Introduction

This section reports upon the results associated with the explanatory variables considered in this study. The section begins with discussion of results related to local government finances and the general community characteristics in which the local governments are located. The following section reports upon the results of each category of variables.

3.3.2 Local Government Finances

The information presented in Tables 3.9 and 3.10 provide a snapshot of each site's financial capacity. The information does not point to which local government is richer or poorer because each local government provides different services which make such a comparison inappropriate. For instance, Juneau and Kenai own hospitals which are major revenue, cost and net asset elements; they may or may not have associated debt. All of the Oregon counties provide police and jail services which also have major revenue, cost and net asset elements and may or may not have associated debt. The purpose of considering financial capacity is to determine if a site is operating so close to breakeven that a significant emergency expenditure or ability to take on a new service (e.g., pursuit of sustainability) is difficult or at all possible. Indeed, Saha (2009b) believes that for small local governments, sustainability is viewed as a "luxury expenditure" and thus more likely to be subjected to budget cuts.

Table 3.9. Summary of Local Government Financial Characteristics

	Expenditures per capita	Revenues per capita	Debt per capita	Net assets per capita	Fund balance per capita
Juneau	$8,131	$9,449	$5,241	$25,607	$2,193
Sitka	$5,814	$6,600	$3,565	$30,610	$6,330
Fairbanks	$1,642	$1,738	$1,307	$6,070	$1,260
Kenai	$2,140	$1,978	$678	$4,986	$1,109
Ketchikan	$2,947	$3,716	$3,925	$12,537	$2,197
Kodiak	$1,866	$2,231	$7,551	$12,404	$4,024
Ashland	$1,232	$1,426	$833	$5,323	$223
Milwaukie	$1,441	$1,540	$344	$3,367	$496
Helens	$1,106	$1,269	$906	$3,780	$587
Clatsop	$1,121	$857	$101	$5,781	$671
Columbia	$1,092	$1,056	$535	$891	$177
Crook	$1,022	$1,392	$56	$2,716	$1,576
Hood River	$772	$796	$313	$5,034	$1,304
Tillamook	$1,484	$1,538	$502	$2,853	$942
Min	$722	$796	$56	$891	$177
Max	$8,131	$9,449	$7,551	$30,610	$6,330
Mean	$2,272	$2,542	$1,847	$8,711	$1,649
Median	$1,463	$1,539	$756	$5,179	$1,185
Std Dev	$2,116	$2,495	$2,309	$8,910	$1,683

Sources: Comprehensive Annual Financial Reports: City and Borough of Juneau (2013b), City and Borough of Sitka (2013), City of Ashland, (2012b), City of Milwaukie (2012b), City of St Helens (2012), County of Clatsop (2012), County of Columbia (2012), County of Crook (2013), County of Hood River (2012b), County of Tillamook (2012), Fairbanks North Star Borough (2012), Kenai Peninsula Borough (2012), Ketchikan Gateway Borough (2012), Kodiak Island Borough (2014b).

Each local government within the study demonstrates adequate financial capacity as reported by their respective financial audits. The Alaska group has higher levels of long-term debt, net assets, and fund balances than the Oregon portion of the group. The higher levels of long-term debt and net assets may be due the higher costs of capital improvements in Alaska. No explanation is offered for the higher levels of fund balances found in the Alaska sample, though all cases have positive fund balances. The much higher expenditures and revenues shown for the city and boroughs of Juneau and Sitka are largely due to each owning and operating unique services: a hospital and electrical power generation facility, respectively.

The information provided by each site's annual financial audit can be combined with an analysis of each site's debt burden to determine if it has positive financial capacity - an ability to meet an unforeseen emergency as well as the ability to undertake a new service. Table 5.2 describes each site's debt burden using three metrics recommended by Leonard (2004).

Table 3.10. Summary of Local Government Debt Burden

	Debt burden greater than 10% of assessed value?	Debt burden per capita greater than $1,429?	Debt burden per capita greater than 15% of per capita income?
Juneau	No (4%)	Yes – ($5,241)	No – ($5,688)
Sitka	No (9%)	Yes – ($3,565)	No – ($4,824)
Fairbanks	No (2%)	No- ($1,307)	No – ($4,852)
Kenai	No (1%)	No –($678)	No – ($4,618)
Ketchikan	No (4%)	Yes – ($3,925)	No – ($4,592)
Kodiak	No (5%)	Yes – ($7,551)	Yes ($4,180)
Ashland	No (<1%)	No – ($833)	No – ($4,501)
Milwaukie	No (<1%)	No- ($344)	No – ($4,009)
Helens	No (2%)	No – ($906)	No – ($3,269)
Clatsop	No (<1%)	No – ($101)	No – ($3,789)
Columbia	No (1%)	No – ($535)	No – ($3,918)
Crook	No (<1%)	No – ($56)	No – ($3,104)
Hood River	No (1%)	No – ($313)	No – ($3,775)
Tillamook	No (<1%)	No – ($502)	No – ($3,394)

Sources: Comprehensive Annual Financial Reports and Leonard (2004).
Note: Values in parentheses are values based on each case's comprehensive financial report.

Overall, the sites exhibit adequate financial capacities. The Alaska sites have higher expenditures, revenues and debt per capita rates than their Oregon counterparts. The higher rates are likely due to the higher capital and personnel costs associated with Alaska in general. Juneau has the highest expenditures and revenues per capita and the second highest net assets per capita of the fourteen sites. Kodiak has the highest debt burden per capita of the fourteen sites. Hood River has the lowest revenues and expenditures per capita of the fourteen sites while Crook has the lowest debt per capita.

The Oregon sites have the lowest and most manageable debt burden rates. The much lower debt burden per capita is most likely due to the fact that the Oregon sites are older local governments and thus, have longer histories of infrastructure investment and debt repayment. Two of the Alaska sites have high debt burdens; Kodiak and Juneau. Kodiak exceeds two of the three standard metrics while Juneau exceeds one. These debt burden metrics suggest that both Kodiak and Juneau are reaching their capacity to increase long-term debt obligations. However, both Kodiak and Juneau debt to assessed value ratio is within recommended limits. All sites do show positive fund balances indicating an excess of revenues over expenditures. In closing, the budgets and audits of the fourteen sites indicate that all sites have adequate financial capacity to meet unforeseen emergencies and provide new services, albeit such new services may be of limited levels.

3.3.3 Population Characteristics

Table 3.11 provides a summary of selected population characteristics for the cases in the study. The Alaska sites have higher percentages of non-white populations than their Oregon counterparts

and most exceed the national average as well (see Figure 3.2). The Alaska sites also have higher percentages of multi-racial households than the Oregon sites and greatly exceed the national average for this population characteristic. In terms of educational attainment, both Alaska and Oregon sites have higher educational attainment rates that the national average, with the exception of Hood River County which exceeds the national and sample averages for those having attained less than a ninth grade education. Notably, over 50% of Ashland's population have a bachelor's degree or higher, giving it the highest level of educational attainment of all sites in the sample.

Table 3.11. Selected Population Characteristics

Location	Percent Non-White Population	Percent Two or More Races (Household)	Travel time Commute to Work (in minutes)	Percent Educational Attainment less than 9th grade	Percent Bachelor's Degree or Higher
U.S. Average	25.8	2.7	25.4	6.0	28.5
Juneau	30.2	10.9	15.5	1.0	35.9
Sitka	34.1	9.4	12.8	2.1	34.6
Fairbanks	22.1	6.9	19.0	2.2	28.6
Kenai	15.2	4.6	19.2	2.5	23.5
Ketchikan	32.3	11.2	14.0	0.9	23.6
Kodiak	43.1	4.2	10.4	3.9	24.6
Average, Alaska sites	32.8	8.0	18.6	3.1	27.5
Ashland	8.8	3.8	16.2	0.5	56.5
Milwaukie	11.0	4.2	23.9	1.3	24.7
St. Helens	10.1	3.9	33.1	2.9	16.1
Clatsop	8.4	3.9	18.5	2.1	22.1
Columbia	6.9	3.1	31.5	2.8	17.4
Crook	5.9	2.3	21.0	4.3	14.4
Hood River	10.0	2.1	16.4	11.8	26.4
Tillamook	7.3	2.3	19.4	4.7	20.3
Average, Oregon sites	14.7	3.7	22.4	4.1	29.2
Min	5.9	2.1	10.4	0.5	14.4
Max	43.1	11.2	33.1	11.8	56.5
Mean	17.5	5.2	19.4	3.1	26.3
Median	10.6	4.1	18.8	2.4	24.1
Std Dev	12.4	3.1	6.5	2.8	10.7

Source: US Census Bureau (2012c).

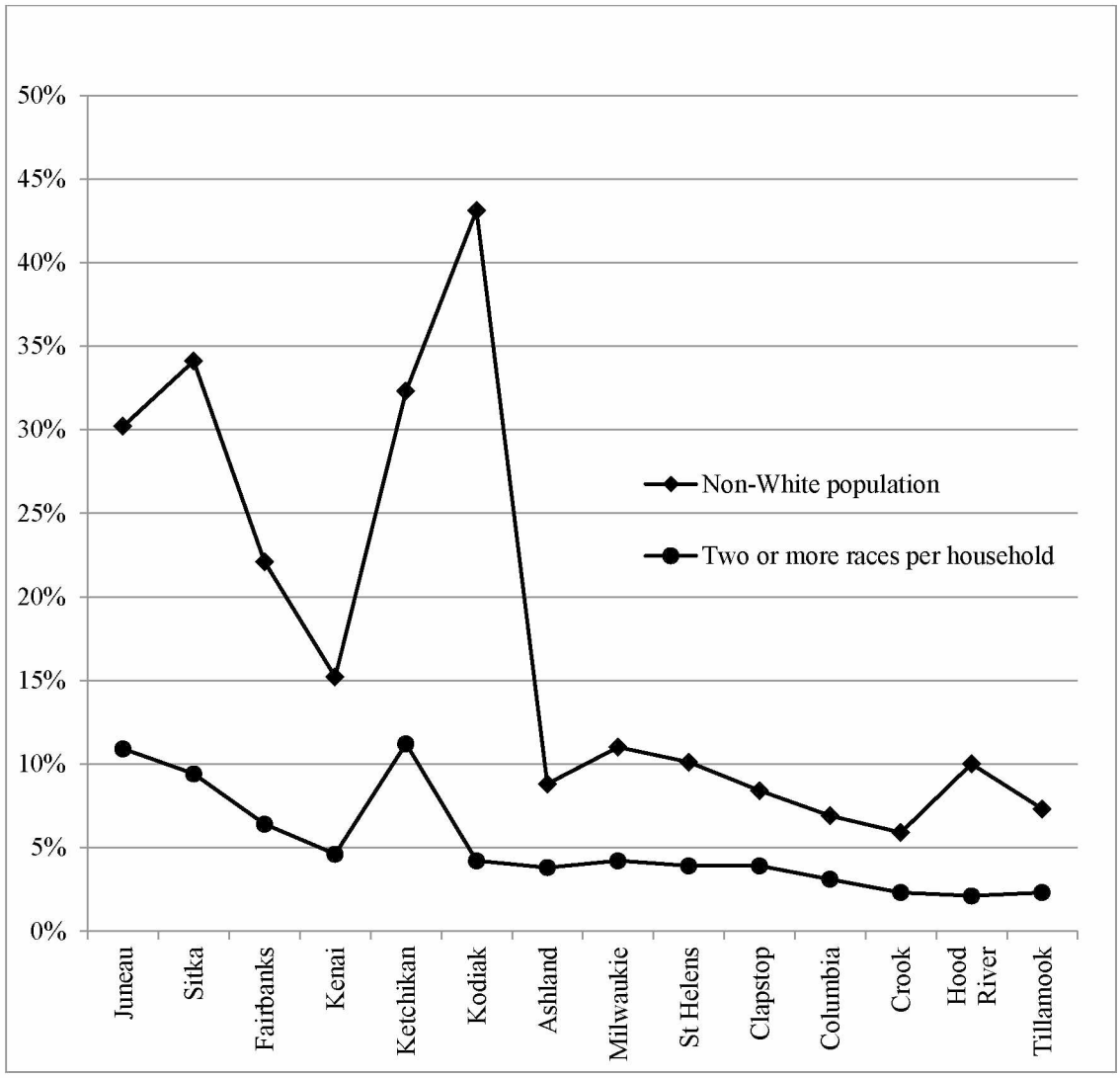


Figure 3.2. Racial Characteristics of Sites
Source: U.S. Census Bureau (2012c).

3.3.4. Housing Characteristics

Housing plays an important role in community well-being (Commission on Housing and Well-Being, 2014). Housing provides shelter in its most basic terms, but it also provides security, a place for family interactions, neighborhood interactions, and very importantly, represents one of the key life-time costs and investments of most American families.

Table 3.12 illustrates the housing characteristics of the fourteen sites. Most of the Alaska and Oregon sites are similar in terms of their percentage of non-traditional households (i.e., households having children with single male and no female present or single female with no male present as well as households containing unmarried partners). However, there is a distinct difference amongst Oregon

local governments in terms the number of non-traditional households. Oregon's rural places having lower percentages of this household category than their more urban influenced counterparts. Juneau has the lowest housing vacancy rate of the sample while Tillamook has the highest vacancy rate, though Clatsop is also relatively high. Alaska's housing has higher values and is also of more recent construction. Oregon's sites have much older housing stock. Lastly, the percentage of housing units with no vehicles present is generally lower in Oregon. The Alaska sites with high household percentages without vehicles may be more an indication of compact, walkable communities than income.

Table 3.12. Selected Housing Characteristics

	Percent Non-Traditional Family-Households		Housing Units				
	Single Parent with children	Unmarried Partner	Percent Vacant Units	Owner Median Value ($)	Percent No Vehicle	Percent Built 1969 or earlier	Percent Moved in 2010 or later
U.S. Average	9.6	2.2	12.5	181,400	9.0	41.6	10.8
Juneau	10.7	4.3	5.6	304,100	8.0	25.7	13.8
Sitka	10.6	4.1	11.5	319,500	11.2	27.8	11.5
Fairbanks	9.7	2.5	13.6	213,500	5.5	21.3	17.6
Kenai	9.3	3.1	27.5	202,300	5.3	12.9	9.0
Ketchikan	9.4	3.5	13.3	262,200	13.4	39.6	16.0
Kodiak	15.0	3.3	16.1	233,100	10.5	25.9	13.8
Average, Alaska sites	11.0	3.0	17.2	237,900	9.6	19.0	13.3
Ashland	10.4	3.6	9.2	367,700	6.0	41.7	14.6
Milwaukie	11.8	3.3	4.6	233,700	7.4	60.4	12.5
St. Helens	11.6	3.0	7.8	186,000	7.9	36.8	9.0
Clatsop	9.1	3.2	26.9	255,600	8.2	47.5	10.5
Columbia	8.6	2.7	7.7	220,400	4.5	35.5	9.1
Crook	7.3	2.3	14.3	204,100	4.4	27.8	12.4
Hood River	5.8	2.2	13.5	314,400	3.6	43.8	6.5
Tillamook	8.4	3.0	40.9	232,400	5.1	34.3	8.1
Average, Oregon sites	8.6	2.9	9.6	246,100	7.9	36.3	12.2
Min	5.8	2.2	4.6	186,000	3.6	12.9	6.5
Max	15.0	4.3	40.9	367,700	13.4	60.4	17.6
Mean	9.8	3.2	15.2	253,500	7.2	34.4	11.7
Median	9.6	3.2	13.4	233,400	6.7	34.9	12.0
Std Dev	2.2	0.6	10.1	53,575	2.9	12.1	3.2

Source: U.S. Census Bureau (2012c)

3.3.5 Income Characteristics

Income and employment measures may also provide a general sense of community's overall well-being since employment is the chief means of most Americans for generating income and

income level determines what individuals and families can afford to do. Table 3.13 provides basic income and employment measures for the sites considered in this study. Alaska sites have higher levels of median household income, lower unemployment and poverty rates than their Oregonian counterparts. Per capital income growth and income equality as measured by GINI coefficients are within similar ranges for the Alaska and Oregon cases. As depicted by Figure 3.3, the Alaska sites have lower poverty rates than the Oregon sites.

Table 3.13. Selected Income Characteristics

	Median Household Income ($)	Percent Per Capita Income Change (2000 – 2012)	GINI Coefficient 2010	Average Percent Unemployment 2000-2012	Percent Poverty All Ages
U.S. Average	**53,046**	**29.9**	**.4712**	**6.3**	**14.9**
Juneau	78,947	41.9	.3869	5.1	6.4
Sitka	66,895	36.2	.3774	5.6	7.4
Fairbanks	69,485	50.1	.4066	6.2	8.0
Kenai	59,421	47.0	.4266	8.7	9.1
Ketchikan	59,736	27.6	.3929	6.8	10.3
Kodiak	70,976	25.5	.3631	7.6	11.5
Average, Alaska sites	**69,917**	**43.6**	**.4132**	**6.9**	**9.6**
Ashland	43,305	40.9	.4974	9.2	18.0
Milwaukie	52,192	25.2	.4026	8.5	14.8
St. Helens	53,151	26.4	.3937	11.3	18.1
Clatsop	44,330	29.4	.4401	6.6	15.8
Columbia	55,358	30.1	.4137	8.6	13.9
Crook	40,263	22.5	.4001	20.5	17.4
Hood River	56,355	40.8	.3937	6.9	10.1
Tillamook	41,869	18.8	.4122	6.9	17.2
Average, Oregon sites	**50,036**	**27.5**	**.4517**	**7.5**	**15.5**
Min	40,263	18.8	.3631	5.1	6.4
Max	78,947	50.1	.4974	20.5	18.1
Mean	56,592	33.0	.4076	8.5	12.7
Median	55,857	29.8	.4014	7.3	12.7
Std Dev	11,897	9.7	.0323	3.8	4.2

Source: U.Ss Census Bureau (2012c).

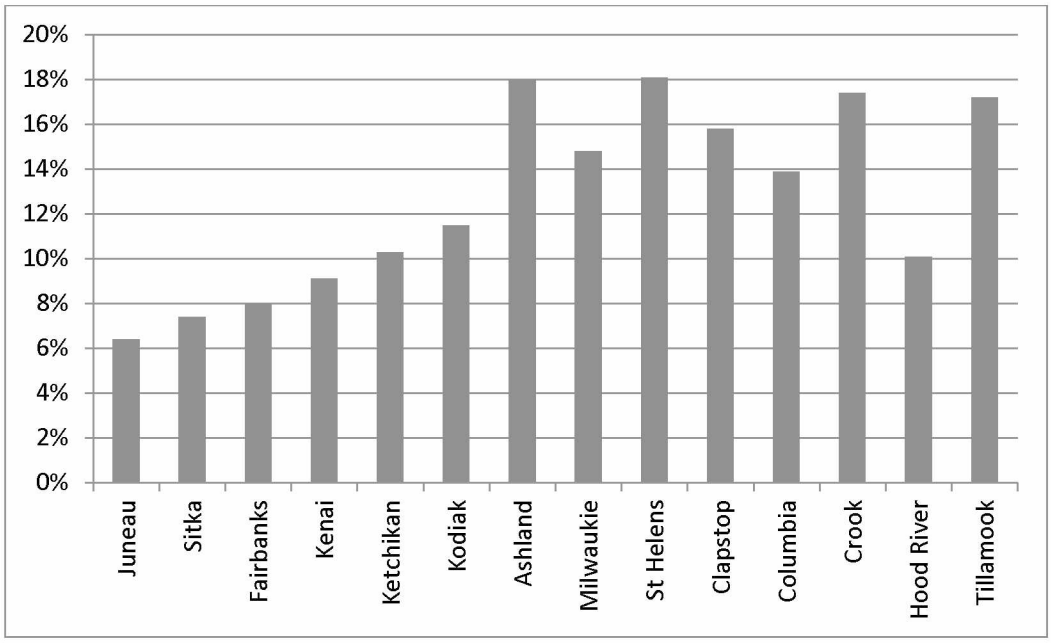


Figure 3.3. Poverty Rate (All ages)
Source: U.S. Census Bureau (2012c).

3.3.6 Economic Base Characteristics

The economic base of a community provides information on the industries and occupations within the community. The economic base describes the proportion of an industry's employment within a location as compared to the national rate for a similar industry. The most common economic base statistic used is the location quotient. A location quotient greater than 1 indicates that the community has a larger proportion of occupations or sector concentration than the national average. In economic base theory, industries that have location quotients greater than one are producing goods or services sufficient to meet local demand with an excess available for export (Bureau of Labor Statistics, 2015; State of Indiana Department of Workforce Development & Indiana University, 2006). Goods that are exported bring new income into the community. Sectors with a location quotient less than one are supplying the local population; hence, new income is not being generated. Table 3.14 describes the economic base characteristics of the fourteen sites. With the exception of the three Oregon cities, Alaska and Oregon sites have location quotients greater than one in the natural resources category which consists of agriculture, forestry, fishing, hunting and mining. Hood River leads in the natural resource category which is related to its agricultural production of pears and forestry products. The leading Alaska sites in the natural resource category are Juneau, Sitka and Fairbanks. Both Juneau and Fairbanks have significant mining operations while Sitka is a center of fish processing. Leisure and hospitality is the other category where most of the sample's cases have

location quotients greater than one. The dominance of natural resource processing and leisure and hospitality activities indicates that the economies of these sites are closely related to the natural environment. This study will explore the relationship of the natural environment with pursuit of sustainability. Lastly, Oregon sites have more manufacturing though the Kodiak Island borough leads all sites in the manufacturing category with a ranking of 3.48. Kodiak's manufacturing activity is related to fish processing. Previous studies have found that manufacturing is negatively related to pursuit of sustainability; however, the type of manufacturing may be a factor. For example, natural resource based manufacturing, such as fish processing, may be positively related to sustainability but non-resource based manufacturing, such as automobile manufacture may be negatively related.

Table 3.14. Economic Base Characteristics

Category	C&B Juneau	C&B Sitka	Fairbanks Borough	Kenai Borough	Ketchikan Borough	Kodiak Borough	City of Ashland	City of Milwaukie	City of St Helens	Clatsop County	Columbia County	Crook County	Hood River County	Tillamook County
Natural resources and mining	4.3	4.0	3.1	4.5	1.6	1.7	0.7	0.2	0.5	1.7	2.8	3.0	12.4	5.7
Construction	1.2	1.6	1.9	1.3	1.2	0.9	0.6	0.8	1.4	1.0	1.1	0.8	0.5	0.8
Manufacturing	0.28	0.4	0.2	0.6	1.0	3.5	0.6	1.1	1.5	1.4	1.6	1.4	1.0	1.6
Trade, transportation and utilities	1.3	1.0	1.3	1.2	1.4	0.7	0.5	1.1	1.1	0.9	1.1	1.6	0.7	0.8
Information	0.9	0.7	0.8	0.6	0.7	0.5	1.3	0.5	0.6	0.6	0.4	0.5	0.5	0.4
Financial activities	0.8	0.5	0.7	0.5	1.0	0.7	0.3	1.2	1.1	0.5	0.7	0.4	0.3	0.6
Professional, and business services	0.6	0.3	0.6	0.3	0.3	0.3	1.3	1.0	0.9	0.3	0.5	0.4	0.5	0.4
Education and health services	1.0	1.4	1.1	1.2	1.0	0.8	1.4	0.9	0.8	0.9	0.8	0.7	0.9	0.8
Leisure and hospitality	1.2	1.1	1.2	1.3	1.2	0.8	1.4	1.0	0.6	2.1	1.0	1.0	1.4	1.6
Other services	1.2	1.0	0.9	1.1	0.6	1.1	1.2	1.3	0.9	1.1	1.6	1.2	0.7	1.4

Source: Bureau of Labor Statistics (2015) and U.S. Census Bureau (2012c).

3.3.7 Summary of General Characteristics Results

The review of the Alaska's and Oregon's local government form and population, housing and income characteristics indicates that the communities share common attributes but also differ in significant ways. All local governments have adequate financial resources to undertake sustainability efforts, especially efforts that do not require large expenditures such as use of environmental purchasing procedures, land use and building code modifications to promote energy efficiency and on-site water management. In addition, the per capita income has grown over the last decade for all sites and their local economies share a concentration in natural resource base industries. Alaska's local governments are larger in physical size, are more rural, have higher non-white populations and more non-traditional households than their Oregonian counterparts. Median housing values and income levels are also higher for the Alaska sites. Oregon's local governments have more authority, as they are all home rule entities. Most of Oregon's local governments are more urban, have higher poverty rates, older housing stock and fewer new residents. The data indicates that there are differences between the local governments that suggest differing views on sustainability yet a sufficient range of characteristics are shared to allow for reasonable comparisons.

In terms of pursuit of sustainability, all have the financial wherewithal even those sites with higher debt burdens – Kodiak and Juneau – because a very large number of sustainability efforts do not require capital investments. Thus, all sites meet one of the conditions identified in the literature as necessary for pursuit of sustainability, namely, financial capacity. In addition, all of the sites have population, housing and income characteristics that are conducive to pursuit of sustainability as all sites appear to be satisfying basic needs. In other words, no sites were found that had above average rates of poverty, unemployment, poor housing or poor educational attainment. These characteristics, especially income and education have been found in previous studies to be related to pursuit of sustainability. However, the population characteristics suggest that the Alaska sites should be more open to new ideas and innovations like sustainability because of their higher rates of non-traditional households, education attainment, and racial diversity. Of the Oregon sites, Ashland in particular has population characteristics that are associated with pursuit of sustainability.

Knowing the general characteristics of the sites, we move to exploring the six categories of variables to reveal any actual disposition to the pursuit of sustainability.

3.3.8 Results: Community Context

Table 3.15 depicts contrasts between the Alaska and Oregon sites for the Community Context variables. The Alaska sites have larger populations in the 20 to 44 age group and the professional, technical, scientific and education occupations plus have higher levels of educational attainment. The

Alaska sites also have higher levels of per capita income, lower levels of poverty and higher female labor force participation. Two of the Alaska sites, Ketchikan and Kodiak, saw population losses during the 2000 to 2010 time period while Juneau and Sitka saw low population growth. All three of these sites are not located on the state's road system and have undiversified economies which may explain the low growth.

Oregon sites, on the other hand, have longer household residency and higher participation in manufacturing occupations, variables having a negative association with sustainability. Population growth for the Oregon sites is positive for all sites except Milwaukie and Tillamook (which had the largest population loss of any site). Oregon sites also have almost twice the percentage of their populations at or below the poverty level and also less racial diversity. The Oregon site of Ashland has the highest level of educational attainment. The site with the highest index score was Fairbanks Alaska with a value of 0.87 and the lowest index of -0.86 was for Tillamook Oregon.

Table 3.15. Community Context Variables (In percent)

Local Government	Population Change 2000 - 2010	Population aged 20 - 44	Population 25 years or more with Bachelors Degree or Higher	Unmarried and Non-Traditional Households	Per Capital Income Growth 2000 - 2010	Population at or below Poverty	Household Residency 1999 or longer	Population Two or more Races	Female Labor Force Participation	Manufacturing Occupation	Professional, Technical, Scientific and Education Occupations	Per Capita Income	Existence of Community-based Sustainability Organizations	Location of Major University	**Index***
Fairbanks	17.8	40.0	28.6	12.2	50.1	8.0	28.0	6.9	67.2	2.6	32.1	32,344	1	1	**0.87**
Juneau	1.8	33.8	35.9	15.0	41.9	6.4	32.2	10.9	68.9	1.3	29.0	37,917	1	1	**0.81**
Sitka	0.5	32.2	34.6	14.7	36.2	7.4	36.8	9.4	68.9	4.0	43.4	32,162	1	0	**0.47**
Ashland	2.8	29.3	56.5	14.0	40.9	18.0	27.9	3.8	59.3	6.1	45.7	30,007	1	1	**0.36**
Kodiak	-2.3	36.0	24.6	18.3	25.6	11.5	27.1	4.1	71.3	10.9	26.0	27,865	0	0	**0.25**
Ketchikan	-4.2	32.0	23.6	12.9	27.6	10.3	30.1	11.2	65.5	4.9	23.4	30,610	0	0	**0.19**
Kenai	11.5	29.4	23.5	12.4	47.0	9.1	39.1	4.6	59.5	4.2	28.1	30,789	1	0	**0.15**
St Helens	28.6	38.2	16.1	14.6	26.4	18.1	25.2	3.9	64.1	16.0	28.1	21,791	0	0	**0.12**
Milwaukie	-1.0	35.4	24.7	15.1	25.2	14.8	34.9	4.2	63.4	11.8	30.8	26,724	1	0	**-0.04**
Hood River	9.5	31.6	26.4	8.0	40.8	10.1	37.7	2.1	64.4	11.2	27.1	25,167	1	0	**-0.09**
Clatsop	4.0	28.6	22.1	12.3	29.4	15.8	34.9	3.9	57.1	8.1	25.5	25,257	0	0	**-0.31**
Columbia	13.3	29.1	17.4	11.3	30.1	13.9	39.5	3.1	56.8	19.5	28.2	26,123	0	0	**-0.51**
Crook	9.4	25.3	14.4	9.6	22.5	17.4	29.8	2.3	48.1	10.9	26.8	20,695	0	0	**-0.65**
Tillamook	-8.3	24.7	20.3	11.4	18.6	17.2	39.7	2.3	52.6	12.8	22.2	22,625	0	0	**-0.86**

Source: U.S. Census Bureau (2012c). Note: As discussed above, a site's index or Z-score is relative to the other sites in the study and is not comparable to state or national values. Unless otherwise noted, a positive score indicates a value higher than the average for all sites while a negative value indicates a lower than average value for the site when compared to the average for all sites. In calculating the index, the variables for population at or below poverty, household residency and manufacturing occupation were first multiplied by -1 as previous studies have found these variables to have a negative association with pursuit of sustainability.

3.3.9 Results: Institutional Setting

The results of Institutional Setting category are presented in Table 3.16. Overall, Ashland and Juneau have the highest rankings, because of their positive values for all variables in the category. The lack of strategic plans and lower content analysis scores separate Ashland and Juneau from Milwaukie and Clatsop. Fairbanks is the site with the lowest score.

Manager forms of government were the majority for sites. Surprisingly, few sites made use of performance measures which is a recommended practice for local governments as it provides a means of determining efficiency and effectiveness of programs. Also, only few sites, Ashland, Juneau and St Helens had adopted strategic planning documents, another surprising result. Strategic plans are documents that provide a framework for organizations to address the future. Strategic plans may be thought of as a potential means of building a sustainable organization; they too, are a recommended practice for local governments.

Table 3.16. Institutional Setting Variables

Local Government	Use of performance measures	Senior government mandates	Manager form of government	Adopted strategic plan	Regular collaboration with other senior management level local government and non-local governmental officials[2]	Index
Ashland	1	1	1	1	2	1.92
Juneau	1	0	1	1	2	1.11
Clatsop	1	1	1	0	1	1.05
Milwaukie	1	1	1	0	1	1.04
St Helens	0	1	1	1	1	0.89
Hood River	0	1	1	0	1	0.38
Crook	1	1	0	0	1	0.12
Columbia	0	1	0	0	1	-0.69
Tillamook	0	1	0	0	1	-0.70
Sitka	0	0	1	0	1	-0.76
Kodiak	0	0	1	0	1	-0.80
Ketchikan	0	0	1	0	1	-0.85
Kenai	1	0	0	0	1	-0.86
Fairbanks	0	0	0	0	1	-1.46

Note: 2-more than the occasional meeting, requires scheduled semi-annual or quarterly for 1, or monthly for 2

3.3.10 Results: Environmental Stressors Variables

3.3.10.1 Storm Events

As reported in the Storm Events database (Table 3.17), flooding, is the highest reported event. A closer review of the 2000 to 2012 history for the sites reveals that Tillamook, Kenai, Fairbanks and Ashland have the highest number of reported events. Of these four sites, flooding is the most reported event for Tillamook and Kenai, wildfire for Fairbanks, and extreme cold for Ashland. Both Fairbanks and Hood River report a large number of flooding and wildfire events during the 2000 – 2012 time period. Only Milwaukie and St. Helens have no events for the time period and Ketchikan follows with only one.

Table 3.17. Storm Data Events 2000 - 2012

Local Government	Flood	Wildfire	Extreme Heat	Extreme Cold	Total Events
Tillamook	35	0	0	0	35
Kenai	21	2	0	0	23
Fairbanks	9	12	0	0	21
Ashland	3	0	0	16	19
Juneau	6	3	0	0	9
Sitka	2	5	0	0	7
Hood River	7	7	0	0	7
Clatsop	4	0	0	0	4
Columbia	4	0	0	0	4
Crook	4	0	0	3	4
Kodiak	2	0	0	0	2
Ketchikan	1	0	0	0	1
Milwaukie	0	0	0	0	0
St Helens	0	0	0	0	0

Source: National Oceanic and Atmospheric Administration (2013b).

3.3.10.2 Disaster Declarations

As reported in Table 3.18 a severe storm is the type of incident for which most disaster declarations were made. All of the severe storms, with the exception of those reported in Kodiak, have associated flooding. Only Kenai reports more disaster declarations associated with flooding than severe storms suggesting conditions of saturated soils resulting from long-periods of rain.

Table 3.18. Federal Emergency Management Administration Declarations 2000 - 2012

Local Government	Wildfire Incident	Flooding Incident	Severe Storm Incident	Earthquake Incident	Other Incident	Total
Kenai	2	6	2	0	0	8
Clatsop	0	5	7	0	1	8
Tillamook	0	5	7	0	1	8
Fairbanks	2	2	2	1	0	6
Columbia	0	3	5	0	1	6
Hood River	2	1	2	0	1	5
Crook	0	2	3	0	1	4
Kodiak	0	0	3	0	0	3
Ashland	1	0	0	0	0	1
Juneau	0	0	0	0	0	0
Sitka	0	0	0	0	0	0
Ketchikan	0	0	0	0	0	0
Milwaukie	0	0	0	0	0	0
St Helens	0	0	0	0	0	0

Includes both Disaster Declarations and Fire Management Assistance.
Source: Federal Emergency Management Administration (2015).

3.3.10.3 Drought

As noted earlier the total number of weeks for the time period 2000 to 2012 is 676 which is the basis for comparing the sites and for calculating percentages shown in Table 3.19. As can be seen, all sites have experienced abnormally dry periods during the 2000-2012 timeframe, including Juneau, Sitka, Ketchikan; sites that typically have large annual precipitation rates. Also, Fairbanks and Kenai witnessed over 25% of the ten year period in abnormally dry conditions which may be a contributing factor to the large wildfires that have occurred in these boroughs. Overall, the Oregon sites have experienced higher amounts and higher levels of drought than their Alaska counterparts. Ashland, Crook and Hood River, all located east of the Cascade mountain range, which presumably acts as a rain curtain, had the highest drought monitor values of the fourteen sites. Of these three sites, the Hood River reports are interesting as Hood River is located on the Columbia River and within the Cascades, a location conducive to higher precipitation.

Table 3.19. Drought Monitor Index 2000 – 2012 (All values in weeks)

Local Government	Abnormally Dry	Moderate Drought	Severe Drought	Extreme Drought	Exceptional Drought
Crook	452 (67%)	220	111	16	0
Ashland[1] (Jackson County)	279 (41%)	105	40	35	0
Fairbanks	235 (35%)	14	0	0	0
Hood River	213 (32%)	103	60	8	0
Milwaukie[1] (Clackamas County)	196 (29%)	93	32	0	0
Kenai	192 (28%)	0	0	0	0
St Helens[1] (Columbia County)	151 (22%)	58	13	0	0
Columbia	151 (22%)	58	13	0	0
Clatsop	125 (19%)	62	0	0	0
Sitka	106 (17%)	9	0	0	0
Juneau	80 (12%)	1	0	0	0
Kodiak	74 (11%)	0	0	0	0
Ketchikan	54 (8%)	1	0	0	0

Note 1: No city values available, county values used instead

Drought Monitor Index severity classification:
Abnormally dry: Going into drought; short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
Moderate drought: Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
Severe drought: Crop or pasture losses likely; water shortages common; water restrictions imposed
Extreme drought: Major crop/pasture losses; widespread water shortages or restrictions
Exceptional drought: Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies
Source: National Drought Mitigation Center (2014), U.S. Department of Agriculture (2014).

3.3.10.4 Air and Water Quality

Table 3.20 and Table 3.21 describe the NEA air pollutant emissions estimates data for the sample, for the report years 2008 and 2011 respectively. Tables 5.16 and 5.17 indicate that the local governments with largest sources of emissions are: Hood River, Fairbanks, Tillamook, Clatsop and Kenai. The major sources of the emissions vary by site. For instance, in Hood River and Tillamook, agricultural production is the primary source of carbon monoxide and particulate matter emissions. During 2011, the Moose Mountain Fire occurred in Fairbanks which very likely affected the air quality in the area and is responsible for the very large emissions increase in 2011; however, as the price of oil has increased in the Fairbanks borough, use of non-petroleum based fuels, e.g., wood, for home heating has markedly increased. Clatsop's source of emissions is mostly from paper

manufacturing. From 2008 to 2011 about half of the sites experienced a decline in air emissions with Hood River reporting the largest decline, about 4,700 pounds per capita (Table 3.22).

Table 3.20. National Emissions Inventory - 2008 (All values in tons)

Local Government	Carbon Monoxide (CO_2)	Ammonia (NH_3)	Nitrogen Oxides (NOX)	Particulate Matter 10 (PM10)	Particulate Matter 25 (PM2.5)	Sulfur Dioxide (SO_2)	Volatile Organic Compounds (VOC)	Total
Hood River	86,007	1,551	2,023	9,965	6,799	458	20,332	127,135
Fairbanks	29,800	273	5,496	18,781	3,090	2,614	4,018	64,072
Kenai	24,837	58	13,521	11,143	2,038	732	5,569	57,899
Tillamook	35,547	1,592	1,696	5,568	2,218	119	5,849	52,591
Clatsop	29,638	304	4,573	7,010	3,658	1,293	5,428	51,904
Columbia	20,928	254	2,448	6,173	1,892	1,831	3,872	37,399
Crook	14,589	783	901	2,967	1,190	76	3,049	23,533
Juneau	8,931	17	6,280	2,804	608	1,199	1,542	21,382
Kodiak	4,958	8	1,321	3,441	434	203	821	11,197
Ketchikan	4,634	11	1,453	2,893	437	258	895	10,582
St Helens[1] (Columbia County)	5,435	66	636	1,603	491	476	1,006	9,712
Ashland[1] (Jackson County)	6,520	148	602	184	496	385	1,308	9,642
Milwaukie[1] (Clackamas County)	4,418	118	558	1,289	288	12	640	7,322
Sitka	2,537	5	637	993	159	199	450	4,980

Notes: 1-City data unavailable, county values adjusted using per capita rates.
As recommended by EPA, the PM10 and PM25 data shown here reports the primary components of particulate matter (PM10-PRI and PM2.5 PRI) and does not include all filterable and condensable versions; thus, there is an underreporting of the total amount of emitted particulate matter.
Source: EPA (2013c).

Table 3.21. National Emissions Inventory - 2011 (All values in tons)

Local Government	Carbon Monoxide (CO_2)	Ammonia (NH_3)	Nitrogen Oxides (NOX)	Particulate Matter 10 (PM10)	Particulate Matter 25 (PM2.5)	Sulfur Dioxide (SO_2)	Volatile Organic Compounds (VOC)	Total
Fairbanks	352,071	5,160	9,729	42,115	27,558	31,605	77,582	545,819
Clatsop	64,022	1,041	4,575	9,093	5,493	1,188	13,913	99,325
Tillamook	54,517	2,183	1,605	8,323	4,538	302	12,368	83,835
Hood River	48,959	850	1,883	6,562	3,993	348	12,076	74,671
Kenai	32,666	71	12,464	14,422	2,100	1,106	8,649	71,479
Columbia	15,852	694	1,957	5,456	1,600	189	3,442	29,190
Juneau	10,954	15	9,062	3,767	748	1,275	1,828	27,649
Crook	12,394	820	701	3,101	1,217	74	2,770	21,075
Ashland[1] (Jackson County)	6,931	166	583	1,414	612	61	1,524	11,292
Ketchikan	5,314	6	2,887	1,262	250	307	981	11,007
Kodiak	5,713	7	1,258	1,489	238	86	870	9,662
Sitka	5,025	13	1,488	781	151	236	716	8,410
Milwaukie[1] (Clackamas County)	4,930	128	526	1,095	368	33	903	7,983
St Helens[1] (Columbia County)	4,117	180	508	1,417	415	49	894	7,580

Notes: 1-City data unavailable, county values adjust to city level by per capita rates.
As recommended by EPA, the PM10 and PM25 data shown here reports the primary components of particulate matter (PM10-PRI and PM2.5 PRI) and does not include all filterable and condensable versions; thus, there is an underreporting of the total amount of emitted particulate matter.
Source: EPA (2013d).

The Alaska local governments follow the respective statewide trend of increasing emissions; perhaps associated with growing economies while the Oregon local governments are a mix of emission increases and decreases. When the sites are compared to national trends, the Alaska sites diverge from the national trend in emission reduction (see Table 3.22). Kodiak's drop in PM10 and PM2.5 is noticeable and is likely related to the conversion from diesel fuel to wind power for electrical power generation

Table3.22. Change in Total Air Emissions 2008 – 2011 (All values in pounds)

Local Government	Average emissions per capita 2008-2011	Per Capita Total Emissions Change 2008-2011	Per Capita Total Emissions Percent Change 2008-2011	Compared to US Average Per Capita Emissions 2008-2011
Hood River	9,088	(4,725)	(41%)	8,107
Fairbanks	6,254	9,880	752%	5,273
Tillamook	5,402	2,474	59%	4,421
Clatsop	4,021	2,522	91%	3,040
Kenai	2,332	490	23%	1,351
Crook	2,115	(235)	(11%)	1,134
Ketchikan	1,596	63	4%	616
Juneau	1,550	396	29%	569
Kodiak	1,521	(224)	(14%)	541
Sitka	1,503	770	69%	522
St Helens[1] (Columbia County)	1,350	(333)	(22%)	369
Columbia	1,350	(333)	(22%)	369
Ashland[1] (Jackson County)	1,037	163	17%	56
Milwaukie[1] (Clackamas County)	751	65	9%	-230
State of Alaska	6,398	9,403	554%	271
State of Oregon	1,719	203	13%	37
United States	981	(65)	(6%)	--

Notes: 1-City data unavailable, county values adjusted using per capita rates.
As recommended by EPA, PM10 and PM25 emissions includes the primary components of particulate matter (PM10-PRI and PM2.5 PRI) and does not include all filterable and condensable versions; thus, there is an underreporting of the total amount of emitted particulate matter and emissions.
Sources: EPA (2013c, 2013d) and U.S. Census Bureau (2012c).

Table 3.23 describes the total chemical and total hazardous air pollutants for the sample sites. The largest emitters of toxic chemicals and hazardous air pollutants are Juneau and Fairbanks which are related to the mining activities located in or very near both areas – Helca Greens Creek Mine (Juneau), Pogo and Fort Knox Mines (Fairbanks). The Juneau and Fairbanks sites emit approximately 625 and 83 pounds of hazardous air pollutants per capita respectively The Clatsop and Columbia counties are the two largest emitters of toxic chemicals and hazardous air pollutants of the Oregon sites. A paper mill is the primary source of toxic emissions in Clatsop while a nitrogenous fertilizer plant is the primary source for Columbia.

Table 3.23. Toxic Release Inventory Report 2012

Local Government	Number of Facilities	Total Chemical Disposal and Releases (in pounds)	Total Hazardous Air Pollutant Disposal and Releases (in pounds)	Total Dioxin and Dioxin-like Compounds Disposal and Releases (in pounds)
Juneau	2	49,835,763	19,760,803	0
Fairbanks	12	12,469,789	8,048,090	0.46
Columbia	6	815,573	38,972	0
Clatsop	4	560,856	373,416	1.28
Kenai	3	88,225	47,423	0.02
St Helens	1	38,903	38,903	0
Milwaukie	4	26,141	25,661	0
Ketchikan	2	1,534	1,534	0
Kodiak	1	140	140	0
Tillamook	3	16	16	0
Ashland	0	0	0	0
Crook	0	0	0	0
Hood River	0	0	0	0
Sitka	0	0	0	0

Note: Totals are for all industries. Total chemical disposal and releases includes total hazardous air pollutant disposal and releases.
Source: EPA, Toxic Release Inventory 2012 data updated March 2014 (EPA, 2015a).

All of the sites within the sample report the presence of at least one impaired waterbody. Tillamook has the highest number of impaired waterbodies with 17 listings while Ketchikan, Kodiak, Kenai and St Helens had the lowest number of listings with 1 each (see Table 3.24).

Table 3.24. Impaired Waters, 2004 -2010

Local Government	Number of Impaired Waterbodies Listed
Tillamook	17
Columbia	14
Crook	10
Hood River	9
Clatsop	7
Fairbanks	6
Juneau	4
Milwaukie	4
Sitka	3
Ashland	2
St Helens	1
Kenai	1
Ketchikan	1
Kodiak	1

Source: EPA. 303(d) Listed Impaired Waters by Causes of Impairment and Probable Sources; 2004 and 2008 Cycle Years (2014a, 2014b, 2014c, 2014d, 2014e).

3.3.10.5 Toxic Sites

As Table 3.25 illustrates Fairbanks has the largest number of hazardous emission and contaminated sites, 20, followed by Clatsop, 7, and Columbia, 6. Only four sites within the sample are devoid of any hazardous emission and contaminated sites; these being, Sitka, Ashland, Crook and Hood River.

3.3.10.6 Disaster Preparedness

Table 3.26 depicts the results of the content analysis and descriptive statistics for the sites. Juneau, St Helens and Tillamook have the highest number of policies, recommendations and implementable actions found in their planning documents that are associated with disaster preparedness. Fairbanks, Columbia and Hood River follow. All of these sites have histories of flooding and wildfire. The low score for Kenai is surprising as it too has a history of flooding and wildfires. The findings for this variable suggest that some sites make more use of the planning documents to effect disaster resilience than others.

Table 3.25. Toxic Release Facility (TRI), Superfund, and RCRA sites

Local Government	Number of TRI Facilities	Number of Superfund Sites	Number of RCRA Sites	Total Facilities and Sites
Fairbanks	12	4	4	20
Clatsop	4	0	3	7
Columbia	6	0	0	6
Milwaukie	4	0	1	5
Kenai	3	0	1	4
Ketchikan	2	1	1	4
Tillamook	3	0	0	3
Juneau	2	0	0	2
Kodiak	1	0	0	1
St Helens	1	0	0	1
Sitka	0	0	0	0
Ashland	0	0	0	0
Crook	0	0	0	0
Hood River	0	0	0	0

Note: Totals are for all industries.
Source: EPA (2015c, 2015c, 2015e).

Table 3.26. Disaster Preparedness

Local Government	Total Policies, Recommendations & Implementation Actions	Z-Scores
St Helens	12	1.72
Juneau	10	1.07
Tillamook	10	1.07
Columbia	9	0.74
Hood River	8	0.42
Fairbanks	8	0.41
Clatsop	7	0.09
Crook	7	0.09
Kodiak	6	-.023
Ashland	5	-.056
Sitka	4	-0.88
Kenai	4	-0.88
Milwaukie	3	-1.21
Ketchikan	1	-1.86
Min	1	-
Max	12	-
Mean	6.71	-
Std Dev	3.07	-

3.3.10.7 Composite Environmental Index

To compare the environmental variables of the various sites, a composite environmental index (CEI) was developed. The CEI is comprised of the standardized scores of each variable that are combined for each site. The combined scores shown in Table 3.27 were multiplied by -1 in order that a negative value represented an environment that had more extreme events and also more reported air and quality impairments. The method used here to construct a CEI is similar to how others have developed composite environmental indices (Socioeconomic Data and Applications Center, 2004; Environmental Impact, Undated). As illustrated in Table 3.27, the values for the composite environmental index place the Juneau and Ashland, the two defined sustainable sites in the middle of the group reflecting the low correlation coefficient between these two variables. The site having the least number of extreme events and impaired air and water quality conditions is Ketchikan followed by Sitka. Fairbanks is found at the other end of the ranking with the poorest overall environment which may be attributed to wildfire, a large number of abnormally dry weeks and impaired air quality related to both wildfire and mining activities. Tillamook has the second poorest ranking which too may be associated with flooding and poorer than average air and water quality.

Table 3.27. Composite Environmental Stressors Index

Local Government	Index
Ketchikan	0.83
Sitka	0.63
Kodiak	0.55
Milwaukie	0.54
Helens	0.36
Ashland	0.25
Clatsop	0.19
Kenai	-0.06
Juneau	-0.13
Columbia	-0.23
Crook	-0.23
Hood River	-0.39
Tillamook	-0.88
Fairbanks	-1.06

3.3.11 Results: Political Party Affiliation

The results of these elections are shown in Table 3.28. Juneau and Sitka are the only Alaska sites that have Democratic Party majorities for the 2008 through 2012 period. And the majorities are just above 50%; thus, these two sites may be considered moderately or leaning Democratic Party communities. The other Alaska sites, however, may be considered strong Republican Party sites as they average just over 60% for the elections considered. For the Oregon sites, all but Crook have moderately or leaning Democratic Party results where the average election returns for the Democratic Party are just at or over 50%. The sole exception is Ashland which has an average Democratic Party affiliation of 80% for the elections. The standardized score results, based on the average political party vote for the 2008 to 2012 elections, are shown in Table 3.29.

Table 3.28. Election Results 2008 – 2012 (All values in percent)

Election	Juneau	Sitka	Fairbanks	Kenai	Ketchikan	Kodiak	Ashland	Milwaukie	St Helens	Clatsop	Columbia	Crook	Hood River	Tillamook
President 2008														
Democrat	56	50	34	30	37	33	83	67	-	50	50	33	64	54
Republican	41	46	63	67	59	64	14	28	-	42	42	58	33	44
US Senate 2008														
Democrat	65	60	45	42	43	42	75	58	-	45	45	25	51	43
Republican	31	36	48	49	50	53	18	33	-	43	43	59	41	51
Governor 2010														
Democrat	47	51	33	31	31	35	79	60	47	44	44	26	55	46
Republican	51	47	64	66	65	61	17	36	47	50	50	69	40	51
US Senate 2010														
Democrat	38	48	23	22	19	24	81	68	56	53	53	41	64	57
Republican	60	49	76	77	79	74	13	27	36	41	41	54	29	40
President 2012														
Democrat	56	56	35	30	37	37	82	54	54	55	55	30	61	50
Republican	39	39	60	66	56	56	15	31	41	40	40	66	34	45
Average 2008-2012														
Democrat	53	53	34	31	34	34	80	52	52	54	49	31	59	50
Republican	44	43	62	65	62	62	15	42	42	40	43	61	36	46

Sources: Alaska: State of Alaska (2014a). Oregon: County of Clackamas (2015), County of Clatsop (2015), County of Columbia (2015), County of Hood River (2015), County of Tillamook (2015).
Note: 2008 Election precinct data for city of St Helens was unavailable.

Table 3.29. Democratic Party Affiliation

Local Government	Score
Ashland	2.25
Milwaukie	0.93
Hood River	0.76
Clatsop	0.38
Juneau	0.30
Sitka	0.35
St Helens	0.29
Tillamook	0.13
Columbia	0.07
Kodiak	-0.99
Fairbanks	-1.00
Ketchikan	-1.03
Crook	-1.22
Kenai	-1.23

3.3.12 Results: New Political Culture

Ashland has the highest New Political Culture ranking and is also a sustainable site; this result conforms to Saha's (2009a) results (Table 3.30). Juneau also has a positive ranking, the third highest, which also conforms to Saha's results. Sitka, with the second highest ranking, is presumably well-placed to pursue sustainability efforts but has not done so as determined by its sustainability score. The remaining sites are similar to Saha's findings, low rankings on the New Political Culture index and little pursuit of sustainability

Table 3.30. New Political Culture

Local Government	Non-traditional Households	Population 20-44	Population 25 years or more with a Bachelor's Degree or Higher	Female Labor Force Participation	Professional, Scientific, Technical and Education Occupations	Index
Ashland	14.0	29.3	56.5	59.3	45.7	1.27
Sitka	14.7	32.2	34.6	68.9	43.4	0.88
Juneau	15.0	33.8	35.9	68.9	29.0	0.70
Milwaukie	15.1	35.4	24.7	63.4	30.8	0.39
Fairbanks	12.2	40.0	28.6	67.2	32.1	0.29
Ketchikan	12.9	32.0	23.6	65.5	23.4	0.09
Kodiak	18.3	36.0	24.6	71.3	26.0	0.07
St Helens	14.6	38.2	16.1	64.1	28.1	-0.07
Kenai	12.4	29.4	23.5	59.5	28.1	-0.26
Hood River	8.0	31.6	26.4	64.4	27.1	-0.32
Clatsop	12.3	28.6	22.1	57.1	25.5	-0.33
Columbia	11.3	29.1	17.4	56.8	28.2	-0.69
Tillamook	11.4	24.7	20.3	52.6	22.2	-0.81
Crook	9.6	25.3	14.4	48.1	26.8	-1.02

Source: US Census Bureau, (2012c).
Note 2: Census categories changed from 2000 Census, as used by Saha (2009a), to ACS 2008-2012. Population category 18-44 was changed to 20-44 and Workforce in occupations Professional, Scientific, Technology and Education was changed to Professional, Scientific, Information, Education, Health Services, and Social Services

3.3.13 Results: Community Well-Being

As depicted in Table 3.31, Oregon sites, with the exception of Ashland, have the highest percentages of individuals without high school diplomas. All sites have fairly large percentages of their children, seniors and low-income populations with low access for food at one (1) mile, suggesting that food security is an issue in these communities. However, only Fairbanks and Sitka address food security matters in their planning documents. In addition, Ashland, Milwaukie and St

Helens have the lowest number in this food security category which suggests that larger rural locations (e.g., counties) may be a factor. Sites with higher poverty rates also have higher food stamp and SNAP participation rtes. Also, participation in the food stamp and SNAP programs indicates that more of the Oregonian sites' populations are accessing these programs than their Alaska counterparts, this result may be due to a higher role that fishing and hunting place in fulfilling basic dietary needs in Alaska plus Alaska's higher availability of fish and game.

Crime statistics reveal that the three Oregon city sites have the lowest violent crime rates, with Hood River and Tillamook counties following. For the two death rates, Kenai and St. Helens have the lowest level while Tillamook the highest. All sites, with the exception of Kodiak, show similar rates for those having no access to health insurance (data collected prior to passage of Affordable Care Act).

In the other sub-category of Community Well-Being, Affluence (Table 3.32), Ashland and Juneau have the highest rankings of all sites for the three measures considered. St Helens, Crook and Tillamook have the lowest rankings; these are the same three sites with the lowest rankings in the Basic Needs sub-category.

The two sub-categories were then combined to yield a composite score for each site. The composite scores show that Ashland and Juneau, once again, have the top scores. The following two high scores are Sitka and Hood River, two sites that have the next highest set of sustainability scores.

Table 3.31. Community Well-Being (Basic Need Variables)

Local Government	Less than 9th Grade and 9th to 12th Grade-No diploma	Population at or below Poverty	Low Access to food for Children and Seniors at 1 Mile	Low Access to food for Low Income at 1 Mile	Food Stamps and SNAP	Civilian Population with Disability	Households without Autos	No Health Insurance	Violent Crime Rate	Property Crime Rate	Intentional Self-Harm (Suicide) Death Rate	Alcohol Induced Death Rate	**Index (Basic Needs Only)**
	All values in Percent								All values as Rates				
Juneau	4.3	6.4	17.1	8.6	8.0	9.7	8.0	16.3	62.69	395.82	15.86	13.16	**0.44**
Ashland	2.8	18.0	2.7	2.1	14.7	22.8	6.0	16.9	43.03	391.09	27.24	17.20	**0.37**
Fairbanks	6.8	8.0	23.4	15.7	5.7	10.1	5.5	13.9	12.91	167.02	17.57	17.57	**0.32**
Hood River	17.7	10.1	17.6	16.3	9.2	10.0	3.6	19.3	8.68	226.90	30.36	31.68	**0.26**
Columbia	11.2	13.9	19.0	13.8	16.5	14.2	4.5	12.5	24.80	206.46	20.54	22.12	**0.20**
Sitka	8.6	7.4	12.0	9.8	11.1	9.1	11.2	19.6	42.69	403.49	16.54	10.29	**0.19**
Kodiak	8.3	11.5	6.7	4.8	7.5	11.4	10.5	26.8	22.69	209.82	29.82	14.87	**-0.10**
Ketchikan	6.2	10.3	12.1	4.4	12.6	12.7	13.4	19.2	14.20	307.31	19.34	14.51	**-0.12**
Kenai	7.2	9.1	28.2	21.3	8.5	15.6	5.3	23.9	8.71	132.24	9.01	10.51	**-0.14**
Milwaukie	7.0	14.8	1.4	1.0	14.3	32.2	7.4	13.2	36.00	488.95	26.78	24.33	**-0.18**
Clatsop	8.1	15.8	25.4	22.0	16.3	17.7	8.2	19.6	8.33	238.93	31.27	13.03	**-0.24**
Crook	14.6	17.4	22.9	15.4	19.9	18.3	4.4	16.0	14.27	343.28	18.61	15.07	**-0.26**
St Helens	12.8	18.1	6.3	4.3	25.2	42.6	7.9	15.2	154.56	376.11	12.09	9.71	**-0.33**
Tillamook	11.5	17.2	31.7	29.0	15.5	14.7	5.1	17.3	10.95	263.52	58.29	50.19	**-0.41**

See next page for source information and notes.

Table 3.32. Community Well-Being (Affluence Variables)

Local Government	Families with a Ratio of Income to Poverty Level of 5.0 or Higher (%)	Median Owner Housing Unit Value ($)	Population 25 years or older with a Bachelor's Degree or Higher (%)	**Index (Affluence Only)**	**Combined Index (Basic Needs & Affluence Combined)**
Ashland	34.8	367,700	56.5	**1.79**	**1.08**
Juneau	48.0	304,100	35.9	**1.21**	**0.82**
Sitka	38.0	319,500	34.6	**0.92**	**0.55**
Hood River	27.9	314,400	26.4	**0.83**	**0.27**
Fairbanks	38.4	213,500	28.6	**0.08**	**0.20**
Ketchikan	41.6	262,200	23.6	**1.01**	**0.11**
Kodiak	33.1	233,100	24.6	**-0.31**	**-0.10**
Kenai	37.3	202,300	23.5	**-0.55**	**-0.16**
Columbia	28.8	220,400	17.4	**-1.66**	**-0.18**
Milwaukie	29.4	233,700	24.7	**-0.67**	**-0.20**
Clatsop	21.6	255,600	22.1	**-1.32**	**-0.34**
Tillamook	18.7	232,400	20.3	**-2.23**	**-0.58**
County	16.1	204,100	14.4	**-3.57**	**-0.73**
St Helens	18.3	186,000	16.1	**-3.52**	**-0.75**

Sources: Demographic data from U.S. Census Bureau (2012c). Food access data from U.S. Department of Agriculture (2013). Alaska death rates from State of Alaska, Vital Statistics (2010a, 2014b); Oregon death rates from State of Oregon Vital Statistics (2010b, 2011a, 2012a). All rates per 100,000. Crime rates from Unified Crime Reports 2010-2012; State of Alaska (2010b, 2011, 2012) and State of Oregon (2010c, 2011b, 2012b), all rates per 100,000.

Notes: Per capita income growth 2000-2010 and All People in Poverty were multiplied by -1 prior to calculations to reverse effect of strong income growth. Final scores were multiplied by -1 to depict sites with better than average community well-being score with a positive number. The boroughs of Fairbanks, Kenai, Ketchikan and Kodiak, do not have police departments but rely on the Alaska State Troopers for police services. The Alaska State Troopers do not collect crime data on a borough basis. Therefore, the summation of all crime data for the municipal police departments within a borough was obtained and converted to a per capita value which was then applied to the borough population to achieve a borough crime rate.

The ratio of income to poverty level represents the ratio of family income to their appropriate poverty threshold. The ratios reported here show the percent of those families having incomes five (5) times greater than their poverty threshold. For example, if a family of four (4) has a poverty threshold of approximately $19,000; the percentages reported here indicate the percentage of families of four (4) having incomes of $95,000 or more (US Census Bureau, 2004).

3.3.14 Summary: A Composite Index of the Explanatory Variables.

A comparison of the sites' Sustainability Score and all of the explanatory variables categories was completed by totaling the standardized results of each category for each site and then averaging the total, yielding a composite index. The composite index provides a relative rank for each site (see Table 3.34).

The sites with the highest sustainability scores, Ashland and Juneau also have the top two composite index rankings. Ashland leads the rankings with higher scores in four of the six categories; these being Institutional Setting, Political Party Affiliation, New Political Culture and Community Well-Being (combined). The next three sites with the next highest composite index rankings, Milwaukie, Sitka, and Hood River follow Ashland and Juneau in sustainability score rankings; however, the order between sustainability and composite index scores is jumbled. Hood River has the third highest sustainability score but the fifth highest index score. Other oddities also exist. For instance, the sites having the lowest sustainability scores do not have the lowest index scores. From the information presented in Table 3.34, it appears that the Community Context, Institutional Setting, and Community Well-Being (combined) may be the cause of the variability. These results are discussed in detail in the next chapter.

Table 3.34. Variable Category Rankings (Composite Index)

Local Government	**Sustainability Score**	Community Context	Institutional Setting	Environmental Stressors	Political Party Affiliation	New Political Culture	Combined Well-Being	**Composite Index**
Ashland	1.89	0.36	1.81	0.25	2.25	1.27	1.08	**1.16**
Juneau	2.12	0.81	1.11	-0.13	0.30	0.70	0.82	**0.63**
Sitka	-0.42	0.47	-0.76	0.63	0.35	0.88	0.55	**0.38**
Milwaukie	0.39	-0.04	0.95	0.54	0.93	0.39	-0.20	**0.34**
Hood River	0.81	-0.09	0.28	-0.39	0.76	-0.32	0.27	**0.11**
St Helens	-0.38	0.12	0.89	0.36	0.29	-0.07	-0.75	**0.01**
Clatsop	0.20	-0.31	0.97	0.19	0.38	-0.33	-0.34	**-0.02**
Ketchikan	-1.00	0.19	-0.85	0.83	-1.03	0.09	0.11	**-0.08**
Kodiak	-0.84	0.25	-0.80	0.55	-0.99	0.07	-0.10	**-0.16**
Fairbanks	-0.58	0.87	-1.46	-1.06	-1.00	0.29	0.20	**-0.28**
Columbia	-0.46	-0.51	-0.69	-0.23	0.07	-0.69	-0.18	**-0.34**
Kenai	-1.08	0.15	-0.86	-0.06	-1.23	-0.26	-0.16	**-0.37**
Tillamook	-0.58	-0.86	-0.70	-0.88	0.13	-0.81	-0.58	**-0.61**
Crook	-0.07	-0.65	0.12	-0.23	-1.22	-1.02	-0.73	**-0.66**

Chapter 4 Discussion of Results

4.0 Introduction

This chapter provides a discussion of the results described in Chapter 3. The chapter begins with a discussion of the results of the response or dependent variables; the content analysis conducted of the sites major planning documents and the scorecard results. The chapter then proceeds with a discussion of the results of the six categories of explanatory variables.

4.1 The Response Variable: Sustainability

4.1.1 Content Analysis

The content analysis revealed that Oregon local governments had higher overall scores than their Alaska counterparts. These higher scores for the Oregon local governments may be a result of the stronger planning statutes found in Oregon. Oregon's state planning statutes, and in particular the statewide planning goals, encourage consideration of subjects related to sustainable development and disaster resilience, e.g., energy conservation, air, water, and land resource quality, and natural hazards. More specifically, Oregon's local governments are required to state how they address each of the nineteen (19) statewide goals. By addressing each state goal, Oregon's local governments have a higher probability of formulating a measure that promotes sustainability or addresses climate change and disaster resilience. For example, Oregon's planning goal #7 describes the state's goals and guidelines for natural hazards. Every Oregon plan reviewed in this analysis contained discussions and recommendations for reducing risk from natural hazards. Similarly, Oregon's planning statutes address agricultural land preservation and conservation of sensitive lands and so did every comprehensive plan adopted by Oregon's local governments. By comparison, Alaska's planning statutes are silent on such topics and Alaska's comprehensive plans reflect the silence. State planning statutes therefore appear to influence the topics addressed by local governments.

On the other hand, the research found that neither state's planning statutes require consistency or consideration of goals specifically related to sustainability, climate change, and resilience. The failure of state planning mandates addressing these topics may be a reason few planning documents analyzed in the study considered these topics. Furthermore, the few goal statements addressing sustainability, climate change and resilience suggests that these issues are not priorities for most of the study's local governments.

Table 4.1. Planning Document and Sustainability Scores

Local government	Comprehensive plan scores	Zoning document scores	Hazards mitigation plan scores	Combined planning document scores	Sustainability scores
Juneau	43	19	16	78	2.12
Ashland	36	27	9	72	1.89
Hood River	39	18	14	71	0.81
Milwaukie	37	20	6	63	0.39
Clatsop	32	19	12	63	0.20
Crook	24	18	10	52	-0.07
St Helens	17	22	15	54	-0.38
Sitka	30	9	4	43	-0.42
Columbia	24	13	11	48	-0.46
Fairbanks	25	11	10	46	-0.58
Tillamook	23	12	12	47	-0.58
Kodiak	27	5	4	36	-0.84
Ketchikan	29	3	0	32	-1.00
Kenai	22	5	4	31	-1.08

The combined scores for the sites' major planning documents generally follow each site's Sustainability Scores (Table 4.1). Juneau and Ashland have the most sustainability related measures within their major planning documents and also the highest Sustainability Scores. Of these two sites, Juneau's comprehensive plan is somewhat stronger in terms of sustainability measures than Ashland's. Ashland's zoning and hazards mitigation plan, however, are somewhat stronger in term of sustainability measures than Juneau's. There are notable exceptions however. Ketchikan and Kodiak have among the lowest combined content analysis scores, yet fall in the middle of the pack in terms of Sustainability Scores. In contrast to Ketchikan and Kodiak, St Helens has a relatively high combined planning document score yet has the lowest Sustainability Score. The differences are likely due to the amount of implementation, whether formal or informal as both Ketchikan and Kodiak each have only limited and informal pursuit of sustainability.

Juneau and Ashland scored the highest in this category while the remaining sites have low scores. Moreover, only Juneau and Milwaukie had evidence of sustainability related goals/policies in their respective comprehensive plans, scores in this category for the remaining sites were earned from the sites' hazards mitigation plans. The low incidence of goal statements in the comprehensive plans suggests that many of the goals and policies that were identified serve

the purpose of hazards mitigation or disaster resilience rather than other purposes such as to create more compact, dense development as a transportation-related sustainability measure.

The low combined scores for the disaster resilience category are due to the lack of recommendations that may be incorporated within zoning ordinances such as revising design standards as an adaptation to climate change, e.g., using larger culverts to reduce flooding from large rain events. In addition, the analysis indicates that the linkages between the hazards mitigation plans and zoning ordinances and comprehensive plans are weak. No hazards mitigation plan recommended building code revisions, non-development zones or other zoning-like changes to reduce risk to people and property in hazardous areas. Almost all of the hazards mitigation plans prepared in Oregon discussed disaster resilience, yet the concept did not appear in any Oregonian comprehensive plan nor was it found in Alaska's.

The economy, while addressed in comprehensive plans, received low scores because sustainability initiatives such as livable wages, workforce development and economic diversity were not identified. Also, recommendations for the economy were not mentioned in hazards mitigation plans even though economic diversity is related to disaster resilience (Xiao & Drucker, 2013).

Finally, food security received the lowest attention in the planning documents. This is a surprising finding particularly for Alaska since the vast majority of Alaska's food is imported and most communities' food supply can be measured in days. Food security is also a challenge for the same population groups in the Oregon counties; yet few county planning documents address food security. The subjects of crime, public health, and education are other notable topics missing in the planning documents.

The content analysis also demonstrates the use of formal adoption methods by Juneau and Ashland to implement sustainability measures. Each of the planning documents considered contained sustainability-related measures and were subject to community-based public participation efforts, public hearings and in the end adopted by ordinance by the respective governing bodies. These formal adoption measures support sustainability as an important community goal and provide the authority for local government pursuit of sustainability. Furthermore, these formal adoption measures provide a stronger foundation for the pursuit of sustainability because while organizational changes may occur, such as personnel changes, the measures remain in effect.

All of the sites have adopted and implemented the basic planning documents of local governments; these being, the comprehensive plan implemented through a zoning ordinance. However the content of these planning documents as they pertain to sustainability are markedly different. Only Juneau and Ashland have planning documents that include specific policies related to sustainability. Moreover, Juneau and Ashland also implement many of their sustainability polices through their zoning ordinances. The otherwise high values associated with Content Analysis for the Oregon sites are a reflection of Oregon's state planning mandates which require that locally adopted comprehensive plans include sections on conservation or natural resources and hazards mitigation which appear to result in recommended policies that are similar to sustainability efforts.

4.1.2 Sustainability Scores

Two scorecards were used to determine if the local governments considered in this study were pursuing sustainability and if so, to what degree. The results of the scorecard evaluation is that Juneau and Ashland met the definition of a sustainable site in that they are formally and actively pursuing sustainability programs and practices. Juneau and Ashland separate themselves from the rest of the cases in two ways. The first difference is that these two local governments are involved in more programs and practices than the remaining twelve. The sustainability programs and practices that Juneau and Ashland are implementing involve practices that address building construction and maintenance standards which attend to a major source of greenhouse gas emissions - buildings (U.S. Green Building Council, 2010). In addition, both Juneau and Ashland have sustainability plans, environmental purchasing procedures, sustainability commissions and personnel dedicated to the ongoing work of sustainability.

These aspects of Juneau and Ashland's sustainability work provide a foundation for long-term achievement. For instance, the points scored for the sustainability plan, sustainability commission, dedicated personnel and budgetary support indicate governing body and community support for sustainability that provides a basis for ongoing action. In addition, the sustainability work of Juneau and Ashland demonstrates community support for these sustainability related activities because the community must indicate support for the measures during public participation efforts and public hearings related to plan and budget adoption as well as by paying for them via taxes and fees.

Moreover, it provides the opportunity to develop an organization-wide focus on sustainability and aligning programs and practices to sustainability focus; thereby making the goal of sustainability more likely to be achieved. In addition, employees who engage in sustainability efforts at Juneau and Ashland do so with the full blessing of the organization as evidenced by formal actions by the governing body, administrative policies and employee orientation manuals. Thus, sustainability accomplishments are much more likely to occur and be shared throughout the organization.

Based upon my interviews with the city managers and my surveys, only Juneau and Ashland indicated evidence of having implemented sustainability related "best practices." Best practices are recommended initiatives taken by other local governments or organizations that have been found to be successful at enhancing sustainability. The establishment of formally recognized sustainability commissions is an example of a best practice adopted by both Juneau and Ashland.

Scorecard two results also distinguish Juneau and Ashland from the remaining twelve sites. The major areas of difference between the two groups are: use of formal adoption methods, adoption of a sustainability plan, building construction practices and environmental purchasing procedures and use of a sustainability commission.

Only Juneau and Ashland provide evidence of sustainability programs and practices adopted by ordinances and resolutions of their respective governing bodies. Such actions are evidence of formal adoption measures and indicate that sustainability has legal standing and is a priority of the local government. In addition, both Juneau and Ashland have sustainability advisory boards/commissions which provide the respective governing bodies and administrations with advice on sustainability measures. Moreover, the use of advisory boards/commissions is a way of ensuring that active work takes place on sustainability and is not crowded out by other issues on a governing body's agenda.

Even though all sites have conducted some form of building related energy consumption analysis and use renewable energy sources, two categories that may provide major cost savings and environmental benefits are ignored. As stated above, buildings account for thirty-nine percent of the nation's greenhouse gas emissions (U.S. Green Building Council, 2010). The costs to heat and cool local government buildings are also major budget items. Developing and implementing building codes that increase energy efficiency provides the dual benefit of lower greenhouse gas emissions and lower energy costs.

The other area ignored by almost all local governments is the use of environmental (i.e., sustainable) purchasing procedures (EPP). Local governments regularly purchase large quantities of products and supplies for lighting, cleaning, and heating; they also purchase equipment and materials such as windows, roofing, and paving. Sizeable cost savings and environmental benefits are achieved by use of EPP which in turn places the local government on a more sustainable path by strengthening fiscal stability and reducing waste. In addition, the use of EPPs provides fiscal support to businesses supplying such products; thereby, providing market support.

4.2 The Explanatory Variables

4.2.1 Correlations

To explore these relationships systematically, a bivariate correlation analysis was completed to test for relationships between the Sustainability Score and the six variable categories. The analysis was completed using the Statistical Package for the Social Sciences (SPSS). The correlation matrix is shown in Table 4.2. The results are that two categories have very weak relationships, two have moderate relationships and two have strong relationships. Additionally, the relationship between the composite index and sustainability score was found to be strong. Pearson correlation coefficient and two-tailed tests were used.

Table 4.2. Correlation Matrix: Response Variable and Explanatory Variables

	Sustainability Score	Community Context	Institutional Setting	Environment Stressors	Political Party Affiliation	New Political Culture	Community Well-Being	Composite Index
Sustainability Score	1							
Community Context	.259	1						
Institutional Setting	.812**	.008	1					
Environmental Stressors	-.037	.174	.264	1				
Political Party Affiliation	.725**	.027	.750**	.137	1			
New Political Culture	.492	.804**	.340	.408	.506	1		
Community Well-Being	.618*	.690**	.225	.126	.466	.826**	1	
Composite Index	.764**	.566*	.677**	.419	.778**	.889**	.804**	1

Pearson Correlation Coefficient

*Correlation is significant at the 0.05 level (2 tailed).

** Correlation is significant at the 0.01 level (2 tailed).

There are strong relationships are between the Sustainability Scores and Institutional Setting (r (12) = .812, p < .01), Political Party Affiliation (r (12) = .725, p < .01) and Composite Index (r (12) = .764, p < .01). There is one moderate relationship between the Sustainability Scores and Community Well-Being (r (12) = .618, p < .05). Finally there are also three weak relationships between the Sustainability Score and the variable categories Community Context (r (12) = .259, p>.05), New Political Culture (r (12) = .492, p>.05) and Natural Environment (r (12) = -.037, p>05).

4.2.2 Community Context

The study found a weak correlation between the variable category Community Context and the Sustainability Scores, (r (12) = .259, p>.05). Contrary to what has been found in previous studies, the variables within the Community Context category reveal a different pattern for the Alaska and Oregon sites. The findings of previous work would predict that the Alaska sites should be demonstrating higher pursuit of sustainability than has been found. For Community Context category, Fairbanks, Juneau and Sitka have the highest index rankings of the fourteen sites, yet of this group, only Juneau is considered a sustainable site based upon its sustainability score. The other sustainable site, Ashland, has a ranking of fourth. Possible explanations for these results may be the historical demographics of Alaska; a recently admitted state with a small population with recent high growth rates and where the older population has tended to relocate elsewhere upon retirement. In addition, the generally higher cost of living in Alaska and its associated higher wages, as compared to Oregon may confound income as a predictor of sustainability. It may also mean that some other condition or set of variables is outweighing the effects of the community context variables.

Another more likely explanation for the lack of relation between Community Context and the Sustainability Score results is that the characteristics of the sites studied here are rural with small populations. Almost all of the previous studies that have found a relationship between the variables within the Community Context category were urban with populations over 100,000. Larger population dynamics, urban density and urban issues may be playing a role in how people think about sustainability and its need.

4.2.3 Institutional Setting

The Institutional Setting category may be thought of as set of organizational conditions that may enhance the pursuit of sustainability. The study found a strong relationship between the Institutional Setting category of variables and the Sustainability Scores, Setting (r (12) = .812, p < .01). Preparing and adopting a strategic plan consists of a deliberate process where an institution examines potential future scenarios in which it may operate with a goal of understanding how it might adjust, if necessary, to remain relevant and viable. This strategic examination creates fertile ground for consideration of sustainability measures since one aspect of sustainability considers what can be done today to enhance future prospects. The use of performance measures causes a local government to actively measure efficiency and effectiveness, and hopefully, to make adjustments where necessary. Enhancing efficiency and effectiveness relates to using resources more wisely, a trademark of sustainability efforts. And senior management mandates and planning documents that speak to sustainability provide a positive framework for actively pursuing sustainability.

The results of the Institutional Setting category suggest that most of the Oregon sites have favorable conditions for pursuing sustainability while most Alaska sites do not. The two Oregon site exceptions, Columbia and Tillamook, haven't taken actions at their own level to build upon the state's planning mandates. For Alaska, the absence of state planning mandates combined with the lack of locally initiated actions in the area of planning documents, strategic plans and performance measures may hinder consideration of more wide-ranging action in the area of sustainability. The lack of strategic plans and performance measures in manager forms of government is a somewhat perplexing discovery as the manager form of government is supposedly a means of instilling professional management techniques into local government operations.

4.2.4 Environmental Stressors

The study found a weak correlation between Environmental Stressors and the Sustainability Scores, (r (12) = -.037, p>05). The Environmental Stressors category is a poor predictor of whether or not a site pursued sustainability efforts. The lack of a strong relationship between the natural environment and pursuit of sustainability, while initially surprising, does mimic findings found in studies of public opinion and climate change. For instance, Brulle, Carmichael and

Jenkins (2012) and Marquart-Pyatt, McCright, Dietz, and Dunlap (2012) found that extreme weather events had no aggregate effect on public opinions regarding climate change. Whitmarsh (2008) also found that while the reporting of air pollution effects on one's health may increase the belief in climate change, it has no effect on whether people will take action to address climate change. Moreover, Whitmarsh found that flood victims in England, while believing that climate change was likely the cause of increased flooding, still did not believe any personal action was needed to address climate change. These findings may explain why the extreme weather events, air pollution and flooding that have been experienced by the sites in this study are not correlated with pursuit of sustainability. For an extreme weather event to initiate pursuit of sustainability, it may require a truly extreme event such as experienced by Greenville, Kansas or on the order of Hurricanes Katrina and Sandy.

Other reasons may also explain the lack of relationship. One potential explanation might be that the public is generally unaware of the amount and type of air pollution taking place in their communities. As stated previously, the air monitoring stations at each site were spotty in terms of number and data collected. Additionally, there appears to be a bias in reporting particulate emissions when any general reporting is done on site websites. Another explanation may be that the general public may be aware of criteria air pollutants such a carbon monoxide and sulfur dioxide due to media coverage, but may not be aware of hazardous air pollutants due to the lack of media and agency discussion.

Perhaps people do not see any direct connection between sustainability and the natural environment, especially since most people are not seeing any direct relationship between climate change and the environment. Thus, the sustainability and environment connection is one step removed and harder to understand, so no action is taken. People may also value economic benefits such as jobs over actions that are perceived to lower employment opportunities. Or it might be cognitive dissonance as noted by Whitmarsh (2009) where individuals take a positive (sustainability) action such as recycling, yet fail to take others like reducing vehicle miles driven; they overestimate their contribution to reducing climate change while at the same time underestimating their contribution to climate change. Lastly, it might be that people have grown accustomed to their polluted environment, seeing it as "normal" and thus do not understand that a different, healthier environment is possible. More study is needed to understand what is behind these results.

To conclude, it seems that if a community's population does not acknowledge the connection and make it a priority issue, it is less likely that their local government will select the issue (i.e., reduce pollution as a sustainability goal) from among its other pressing priorities.

4.2.5 Political Party Affiliation

The study found a strong correlation between Political Party Affiliation and the Sustainability Scores, (r (12) = -.725, $p<.01$). The results found by this study resemble the results of studies that have found a strong relationship between belief in climate change and party affiliation. Ashland is the only site meeting the definition of a sustainable site that also has strong Democratic Party affiliation; a result that is similar to previous studies that have found strong relationship between belief in climate change and Democratic Party affiliation. The other site with strong Democratic Party Affiliation, Hood River, does not meet the definition of a sustainable site. The two Alaska sites of Juneau and Sitka seem to be anomalies as they both may be considered as moderately and leaning Democratic Party affiliation sites, yet are different in terms of their pursuit of sustainability; Juneau meets the definition of a sustainable site while Sitka does not. The sites with high Republican Party affiliation, Fairbanks, Kenai, Ketchikan, Kodiak and Crook have the weakest pursuit of sustainability efforts which is similar to the relationship between Republican Party affiliation and disbelief in climate change.

These results may have several possible explanations. First climate change and sustainability are two different topics. Sustainability is a course of action that may be taken to mitigate climate change; it is not climate change. It would seem, therefore, that the relationship should be weaker since it is measuring climate change belief in an indirect way.

Secondly, the studies that found a relationship between political party affiliation and belief in climate change have typically been based on survey responses. The relationship reported here between the sites' sustainability score and political party affiliation is based upon election results. Elections differ greatly from surveys. Elections are based on issues, candidates, economic performance, and many other perceptions and preferences. A review of the local propositions on each ballot did not reveal any environmental issue brought before the electorate. It is entirely possible that a person could identify themselves as affiliated with the Democratic Party yet vote for a Republican candidate. Furthermore, the number of people willing to respond to a survey is likely to be different than those willing to participate in an election, so the populations are likely to be different as well.

To summarize, a strong relationship between the election results of the sites should not be surprising when considering that there is a linkage between the two topics (i.e., sustainability and climate change). However the differences in how they are being measured (i.e., elections versus surveys) does point to the need for additional research to confirm the results. Even when considering the differences between elections and surveys, the strong relationship found here might actually be congruent with a strong relationship between political party affiliation and climate change.

4.2.6 New Political Culture

The study found a weak correlation between the variable category New Political Culture and the Sustainability Scores, (r (12) = .492, p>.05). The study's results suggest that pursuit of sustainability requires more than the existence of New Political Culture, at least for the cases considered in the study. Ashland and Sitka are similar on all demographic variables except education, Ashland having a considerably higher level of educational attainment. On the other hand, Juneau is also similar to Sitka on most demographic variables with the exception of the percentage of population employed in the professional, scientific, technical and educational occupations, yet Juneau pursues sustainability efforts while Sitka does so at a much lower level. It appears that Sitka may be an outlier in terms of the New Political Culture index. All of the remaining sites have lower index rankings and have been previously shown not to pursue sustainability; thus, supporting the index's relationship with pursuit of sustainability.

4.2.7. Community Well-Being

There is a moderate relationship between the Sustainability Scores and Community Well-Being (r (12) = .618, p < .05). Both Ashland and Juneau have the highest positive rankings for Community Well-Being and are the sites with the highest Sustainability Scores. And the next two sites, Sitka and Hood River are sites with the next two highest sustainability scores. Sitka and Hood River are sites that have undertaken a number of informal sustainability measures particularly in the areas of renewable energy. Similarly, the site with the lowest Sustainability Score, St. Helens, also has the lowest Community Well-Being score. A pattern appears to have emerged pointing to a community's well-being and its pursuit of sustainability; that being, basic needs must be met for a large portion of the population while at the same time a level of affluence is needed to spur sustainability efforts.

There are several possible explanations for the positive relationship between Community Well-Being and pursuit of sustainability among the study's Alaska and Oregon sites. One explanation is that pursuit of sustainability requires that a basic level of community safety, health, education, and wealth exist or be satisfied to allow the local government and community to begin consideration of other needs and wants, such as parks and recreation. Furthermore, communities apparently also require a level of affluence to perhaps spur on the consideration of sustainability. The three measures of affluence: ratio of income to poverty, median household value and educational attainment suggests that affluence and its relationship with pursuit of sustainability warrants further study because the two sites with the highest sustainability scores are also the two sites with the highest levels of affluence. Additional research is necessary to confirm how Community Well-Being is related to pursuit of sustainability, especially the role of affluence and wealth.

4.3 Summary

To summarize, the study found strong correlations between the sites' Sustainability Scores and the variable categories: Institutional Setting and Political Party Affiliation. A moderate correlation was found between the sites' Sustainability Scores and the variable category Community Well-Being. The relationships are in several instances unique and therefore should be considered as a first step in theory building, which requires more comprehensive research to confirm these results.

The study suggests that in order for a small local government to pursue sustainability certain conditions must be met. The first being that the local government must attend to enhancing organizational behavior by monitoring performance and actively seeking out innovated or best practices. Secondly, the community in which the local government is located must have most of its basic needs met in terms of safety, employment and health while at the very same time have residents who have reached a level of affluence and support government activities that go beyond the standard suite of services; sustainability be one such activity.

Chapter 5 Conclusion

5.0 Conclusion

This chapter presents a starting point for continued exploration of local government pursuit of sustainability. There are certain aspects of this exploratory research that I intend to place more focus on in the future. Among these include the role of planning, rural versus urban location, community well-being and institutional setting and the whole notion that a suitable operating environment must exist for sustainability to take place. Lastly, whether complexity theory might help explain these dynamics is another avenue I intend to follow.

Only a few of the planning documents from the sites include specific references to sustainability, climate change or disaster resilience within their goal, objective and policy statements. The lack of such references is in some cases paradoxical. For instance, Ashland has ample evidence of formal adoption measures related to sustainability programs and practices; including governing body resolutions, ordinances, budgetary support, and a separate sustainability plan. However, the city's primary planning documents have much fewer goals/policies statements supporting sustainability efforts. By comparison, Juneau has ample evidence of formal adoption measures and their primary planning documents contain goals/policies statements supporting sustainability efforts. No explanation is readily apparent for this difference in approach.

The importance of linking aspirations (i.e., plan goals/policies) to implementation (i.e., regulations) was also identified as a critical element for pursuing sustainability. For instance, the content analysis demonstrated the importance of the land use element in sustainability efforts. The sites having a higher number of land use related sustainability measures were also the ones with higher Sustainability Scores. Not surprisingly, the content analysis also highlighted the importance of conservation measures in pursuit of sustainability as sites with higher conservation related sustainability measures also ranked higher in terms of Sustainability Scores.

In addition, the content analysis found weak linkages between the hazards mitigation plans and zoning documents, indicating that one of the strongest planning implementation tools was not being used to enhance disaster resilience or sustainability.

Moreover, the study focused on local governments from two states, Alaska and Oregon, which are different in important ways from other states in the Union. For instance, Alaska is a relatively new state with a young population and higher cost of living. An example of Oregon's uniqueness is its state planning mandates and home-rule counties. In addition, the sites

themselves are also different from one another in terms of rural-urban influence, transportation linkages, and forms of government -- manager-mayor-commissioner and city-county-borough.

The results are also limited to the time in which the data were collected, the 2012-2014 timeframe. The majority of the demographic data relies on the American Community Survey, 2008-2012. Some changes have occurred since the data were collected, for instance, the implementation of the Affordable Care Act is likely to affect the number of people without health insurance. Lastly, the sites considered in this study consist of local governments located in rural areas having small populations. Most of the studies on local government pursuit of sustainability have consisted of samples focused on places with populations of 100,000 or more. Once again, this study is exploratory in nature and seeks to lay the groundwork for additional research into what fosters local government pursuit of sustainability. These comments should therefore be kept in mind when reading this section and caution should be used when generalizing these results.

The findings of this study identified two sets of explanatory variable categories, Institutional Setting and Community Well-Being (combined) that shed some light on why a local government would choose to pursue sustainability. Sustainability is one method of improving local government as sustainability seeks more efficient and effective use of scarce resources. The Institutional Setting category considers a local government's efforts to become more effective and efficient as measured by their interest in performance measures, strategic plans, etc. The variables within the Institutional Setting category are recommended practices of municipal organizations such as the International City and County Manager's Association (ICMA) for improving local government performance (ICMA, 2015). The variables also provide insight into how "forward thinking" a local government is as well. Use of performance measures and strategic planning are methods by which a local government revises current practices to become more efficient while also considering how to respond to future conditions.

At the institutional level, undertaking community planning efforts and, most importantly, *implementing* the planning efforts, is necessary for building a foundation for sustainability. Active planning efforts build community support and understanding of methods that enhance sustainability. Both Ashland's and Juneau's planning documents support this notion. Both Ashland and Juneau made use of performance measures which suggests that they are actively seeking ways to improve their efficiency and effectiveness of services. The use of performance measures may cause investigation of different methods of providing services which in turn may lead to the development of sustainable programs and practices.

Another institutional characteristic is the form of government. Prior studies found that manager-council forms have a positive relationship with sustainability. This study found similar results; both Ashland and Juneau are manager-council forms of government. However, I believe more research is necessary on the role the governing bodies play since they set policy and approve budgets to implement the policies.

Community Well-Being (combined) also has a strong relationship with a site's Sustainability Scores. In fact, this study's results suggest it is a superior category of variables than Community Context. It may be that the variables used within the Community Well-Being (combined) category are more suited to rural areas. Once again, the variables used in the Community Context category are based on prior studies which focused on urban areas having a population greater than 100,000 and in most cases greater than 250,000.

As stated earlier, this finding suggests that a community's level of economic, safety and health conditions must be at a basic level of satisfaction. Presumably, achieving fulfillment of basic economic, safety and health conditions means that there is a level of adequacy with local government services are adequate, local economic performance and community resources such as housing and access to food. In addition, the category's inclusion of basic wealth or affluence variables highlights another aspect of Maslow's hierarchy of needs (Maslow; 1943) that being, that a certain amount of community wealth is necessary for the consideration of higher levels of community aspirations. Stated another way, pursuit of sustainability might only be considered when essential services are adequate and a sufficient amount of community-based affluence calls for achievement of more lofty, non-essential activities. It may also be that community-based affluence helps provide the impetus for new ways of conducting local government work which in turn fosters consideration of sustainability efforts.

The role of Community Well-Being in local government pursuit of sustainability warrants additional study, especially how the concepts of Basic Need fulfillment and achievement of Affluence relate to one another and pursuit of sustainability. For example, a separate correlation computation was conducted to consider the relationship of the subcategories Basic Need and Affluence with the sites' Sustainability Scores. Both the Basic Needs and Affluence subcategories were found to have a moderate relationships (r (12) = .581, $p < .05$), (r (12) = .557, $p < .05$), respectively. Both subcategories are important and further research is necessary to refine the variables within the subcategories as well as to further test the relationships.

The study also found a strong relationship with Political Party Affiliation and the sites' Sustainability Scores. It might be that a conducive political environment is necessary to the pursuit of sustainability. While both Alaska and Oregon local governments are non-partisan, political attitudes still exist and affect behavior, especially that of public officials. The political polarization of belief in climate change is very likely affecting the pursuit of sustainability efforts because sustainability efforts are commonly discussed and seen as a means of mitigating the challenges of climate change. So if the political environment of the local government is antagonistic to climate change, local government officials are less likely to pursue sustainability. This study's findings provide some support for this contention as both Ashland and Juneau are places with Democratic majorities as evidenced by their election results. The political environment may also influence the methods of adoption as well. A conducive political environment may support formal adoption methods because the purpose and rationale for pursuit of sustainability is less likely to be controversial and may therefore be readily acknowledged. Informal methods of adoption might be used by local governments wishing to pursue sustainability efforts in less than conducive political environments; hence, they avoid using the term "sustainability" and its rationale "mitigating climate change" to avoid controversy. Rather, they concentrate on other potential benefits such as lower taxes due to fuel savings. Speaking as a practitioner of local government who pursued sustainability by using informal techniques due to a less than conducive political environment, this line of reasoning makes sense.

The other basic condition that appears to be necessary is a community that is open to new ideas as described by New Political Culture. However, the study found a weak correlation between New Political Culture and the site's Sustainability Scores. A willingness to consider new ideas provides a supportive environment where experimentation with innovations may take place. A community that is open to new ideas is also more likely to adopt planning documents that address difficult issues and contain different approaches as well as elect public officials who are willing to consider new methods. Modifying zoning ordinances and building codes to enhance energy efficiency and disaster resistance are difficult issues because they restrict private property and cost money, yet both Juneau and Ashland, communities with above average rankings in the study's measure of openness to new ideas, New Political Culture, have moved forward in these areas.

Two categories of variables were found to have weak or little relationship with a site's Sustainability Score; these being, Community Context and Environmental Stressors. As

previously discussed, the lack of a moderate or strong relationship between Sustainability Scores and Community Context may be due to the difference in the places studied in terms of rural versus urban and population size less than 50,000 as done here and places having populations greater than 100,000. Small, rural areas are likely to behave differently than large urban areas.

The lack of a moderate or strong relationship with the Natural Environment category is more difficult to explain. The lack of a strong relationship between the natural environment and pursuit of sustainability is consistent, however, with previous studies of public opinion and climate change. Brulle et al., (2012) and Marquart-Pyatt et al., (2012) found that extreme weather events had no aggregate effect on public opinions regarding climate change. In addition, Whitmarsh (2008) also found that while the reporting of air pollution effects on one's health may increase the belief in climate change, it has no effect on whether people will take action to address climate change. Whitmarsh also found that flood victims in England, while believing that climate change was likely the cause of increased flooding, still did not believe any personal action was needed to address climate change. These findings may explain why the extreme weather events, air pollution and flooding that have been experienced by the sites in this study do not reveal any relationship with pursuit of sustainability. For an extreme weather event to initiate pursuit of sustainability, it may require a truly extreme event such as experienced by Greenville, Kansas or on the order of Hurricanes Katrina and Sandy.

It may also be that the general public is generally unaware of the amount and type of air pollution occurring in their communities. The media typically reports on air pollution during abnormal events but do not provide any regular reporting on trends leaving a void in reporting. People may also not understand the connection between sustainability and the natural environment, especially since most people are not seeing any direct relationship between climate change and the environment. Thus, the sustainability and environment connection is one step removed and harder to understand, so no action is taken. Lastly, it might be that people have grown accustomed to their polluted environment, seeing it as "normal" and thus do not understand that a different, healthier environment is possible.

To summarize, complexity theory tells us that sustainability is an evolutionary process requiring a different way of thinking, working and relating (Mitleton-Kelly, 2011, p.46) and that change depends on the influence of key contextual factors and how they interact at a particular moment in time (Haveri, 2006, p. 33). From a complexity theory perspective, it may be that pursuit of sustainability requires that a set of basic conditions be met first, such as, fulfillment of

basic community needs, a stable government with sound financial capacity and one with an active planning effort. Once these basic factors are in place, then an operating environment conducive to fostering sustainability must arise described by institutional setting, political party affiliation, a willingness to accept new ideas and a level of community affluence for the pursuit of sustainability efforts to take place.

Based on the results found here it appears that local government leaders must attend to a few fundamentals in order to create the conditions to foster sustainability. The fundamentals include developing a local economy and providing basic services that fulfill their resident's basic needs of well-being. Special attention should be given to enhancing the community's ability to participate in the knowledge based economy which means focusing on education, openness to diversity and innovation. Such steps are likely to increase affluence and willingness to accept new ideas which are necessary for innovation which includes sustainability. Lastly, local government leaders must themselves dedicate time and effort to collaborating with their counterparts inside and outside of local government in order to become exposed to new trends and ways of pursuing their work. Through dedicated efforts to these areas, exposure to new ideas, innovations such as sustainability, are more likely to occur and a receptive community created.

This exploratory research identified the variable categories of institutional setting, political party affiliation and community well-being as having strong to moderate association with local government pursuit of sustainability. In other words, of the variables studied, these three categories are the most likely to foster sustainability. If these results are confirmed by further studies, then doing what we can to increase these four characteristics would also foster sustainability. The study also suggests that small local governments behave differently than large local governments (populations exceeding 250,000). While additional research is necessary to confirm this study's exploratory findings, it appears that in order for local government pursuit of sustainability to occur, a favorable milieu as described by the variable categories noted above must exist.

Chapter 6 Implications for Policy and Research

6.0. Introduction

This exploratory study found that certain variable categories bear additional scrutiny for their potential to explain why some local governments pursue sustainability efforts while others do not. This study also identified several implications for future policy and research related to local government pursuit of sustainability. The understanding of why some local governments pursue sustainability efforts while the vast majority do not is a complex problem that requires serious attention if the nation is to move forward in its efforts to mitigate the challenges of climate change. Additional study to explore and confirm the results found here would help in this effort. The following sections describe these areas.

6.1. Local Government Planning

This study provides criteria for understanding how local governments' primary planning tools are being used to address sustainability, climate change and resilience. This method of analysis can also be used to identify improvements to state planning mandates to provide better guidance on plan content.

A common complaint about planning is that after large investments of resources, plans are prepared and then left to "sit on the shelf." The method used here offers a means of evaluating whether or not this complaint has validity by determining if plans are actually being implemented, and if so, the strength of the implementation. Another benefit of this method is that it identifies the weak links between plans and implementation measures that can result in remedial efforts to achieve more of a plan's goals. In other words, the approach highlights where goals, policies and recommendations are not being implemented thereby allowing the practitioner to focus on distinct elements and improve implementation one step at a time.

The method can also be used to evaluate different planning approaches. For instance, many local governments address climate change issues through sustainability plans rather than comprehensive plans. Comparing the two approaches could provide practitioners with information on the efficacy of each approach. The sites with the highest Sustainability Scores, Juneau and Ashland, have also adopted a climate action plan (Juneau) and a sustainability plan (Ashland). It might be that placement of climate change and sustainability matters directly within comprehensive plans would result in more effective implementation. A review of these different

approaches and a content analysis of these plans as well as their respectively zoning and hazards mitigation plans might find more direct linkages.

A local government's consideration of sustainability and climate change may also be more a function of community economic and demographic characteristics than state planning mandates.

To conclude, our local governments have the requisite planning tools to achieve sustainability and climate change adaptation. We do not need to invent something new; we only need to use what we have more effectively. Evaluating local government use of these primary planning tools can lead to improving their effectiveness and result in more serious sustainability and climate adaptation efforts.

6.2. Sustainability and Politicization

Further research is needed to determine if the politicized nature of the terms sustainability and climate change hinder local government planning efforts to address climate change and sustainability. Such research may suggest different approaches to accomplish these goals. In addition, Political Party Affiliation and support of sustainability should be tested via surveys as well as completing additional analyses of election results.

6.3. Rural Areas

Additional study of rural areas with small populations needs to be conducted as this group of local governments is largely ignored in the literature. It is the small, rural local governments that comprise the majority of the general purpose local governments in the United States and understanding their uniqueness and special challenges in the area of sustainability will improve efforts to foster pursuit of sustainability. The lack of a strong relationship between pursuit of sustainability and community context needs to be further explored in the rural setting. It may be that for rural areas a different group of variables provides a better means of understanding whether or not a rural local government will pursue sustainability.

6.4. Community Well-Being

The same can be said for variables comprising community well-being; additional research is necessary to confirm the variables used in this dimension. Also, it is necessary to know if the same group of variables is relevant in both rural and urban settings, and if not, what variables set them apart. Another aspect of community characteristics that is recommended for further analysis

is whether or not there is a difference between poor and rich communities in terms of their pursuit of sustainability. Do high levels of income and educational attainment truly affect pursuit of sustainability?

6.5 Role of Professional Organizations

An additional area that may benefit the understanding of local government pursuit of sustainability is the role, if any, of the various professional organizations in fostering sustainability and how these efforts may be improved. Presently, all of the major professional organizations, such as the American Planning Association, International City/County Managers Association, National County Association, and U.S. Conference of Mayors have committees and have produced "best practices" related to enhancing local government adoption of sustainability efforts. Further research may identify the efficacy of these measures and how they may be improved. Furthermore, additional research on how new technologies and platforms such as Internet-based webinars and discussion forums may be used to foster collaboration would be useful.

6.6. Role of Governing Body

The role of the governing body is another area that bears much closer attention. While there has been focus on the "head" of government, the manager and mayor, little attention has been paid to the role of local government governing bodies in pursuit of sustainability. This area of research is particularly necessary as it is the governing bodies that have final approval authority of local government policies, programs and the implementing budgets. Understanding why some governing bodies are willing to approve funding and implementation of sustainability efforts will add greatly to the understanding of local government pursuit of sustainability.

6.7. Role of Collaboration

This study suggests that a component of Institutional Setting, deliberate and effective form of collaboration between counterparts and those from outside of local government, is a necessary attribute. It is, in other words, the process of diffusion. The finding suggests that pursuit of sustainability is similar to the adoption of innovative practices by local governments. Innovations, which consist of practices that are new to an organization even if performed elsewhere, are adopted through a process of diffusion that enables practitioners to learn from trusted peers. As

stated by Rogers (2003, p18) "...most people depend mainly upon a subjective evaluation of an innovation that is conveyed to them from other individuals like themselves who have already adopted the innovation. *Diffusion is a very social process that involves interpersonal communication relationships*." [emphasis added].

It is important to note that collaboration is much different than "meetings" where the focus in on single topics or the "issue du jour" Rather, collaboration consists of "meetings" where there is a search for new approaches or as active problem solving exercises. In this study both managers at Juneau and Ashland had ongoing collaboration occurring with their peers. All other officials indicated that they had a plethora of meetings, but only Ashland and Juneau were engaged in the diffusion described by Rogers.

Lastly, speaking as a former local government manager, it is difficult to set aside precious time for regularly scheduled meetings that are not addressing specific, daily matters. It might be even harder to initiate and maintain truly collaborative efforts in rural areas because of the distances between parties and lower number of network opportunities. Yet in order to improve local government organizational performance, a deliberate and constant focus on long-term problems using collaborative approaches is a strongly recommended method of improving organizational performance (Gardner, Churchill, Souza & Willmarth, 2001; Porter, Pickering, & Brokaw, 1995). Since sustainability efforts address long-term issues, a similar approach may be necessary.

6.8. Enhancing Practice

The necessary tools already exist at all levels of local government, whether rural or urban, poor or rich, to achieve a more comprehensive pursuit of sustainability. What appears to be lacking is effective use of these tools and a long-term mindset. As stated early on, local governments in the United States are vested with numerous powers and responsibilities that are related to sustainability; most just are not using these tools in ways that enhance sustainability.

For the practitioner, this study suggests several paths for moving a local government towards the use of more sustainable programs and practices. The recommendations described here are based on the notion that practitioners should first pursue those activities that they have some manner of control over rather than waiting for changes to occur in areas outside of their control because such changes may never take place.

The Content Analysis suggests that sustainability may be strengthened by making it a part of the comprehensive planning process which is a recommended practice of the American Planning Association (2013). The purpose of the comprehensive plan is to guide the future development of the community. Thus, including sustainability in the plan offers the opportunity to build sustainability into the goals and policies which guide the community's development. Moreover, having sustainability as part of the planning process enhances the public's understanding of sustainability programs and practices as well as affording the opportunity to obtain public support for sustainability efforts. Most importantly, when plans do include support of sustainability, it is vital that local government officials ensure that such recommendations are implemented.

Local government officials can make great strides towards achieving a more sustainable community by making their own operations and activities more sustainable oriented. For example, local governments own and operate facilities, buildings, lighting systems, utilities and transportation systems that can be made more sustainable. The scorecards used in this study provide a useful listing of potential sustainability efforts that may be used in these governmental operations. Examples include the completion of energy audits, installing energy efficient lighting and boilers as well as insulation and ensuring that new building and major rehabilitation projects are designed to Leadership in Energy and Environmental Design (LEED) standards to achieve lower energy usage and operating costs. By doing so, practitioners are more likely to reduce operating expenditures through energy savings while at the same time reducing vulnerability to energy price shocks. In addition, building sustainability into local government operations can also create more hazard resilient facilities and operations thereby making their communities safer and less vulnerable to natural, human, and technologically caused disasters.

The Institutional Setting category of variables also offers several paths that local government practitioners may consider to foster sustainability. One is creating a working environment that fosters collaboration and the diffusion of knowledge about sustainable programs and practices. Fostering collaboration should occur both inside and outside the local government. Increasing communication and cooperation between departments, i.e., removing organizational silos, is one way of fostering collaboration within the local government. Fostering collaboration outside of the local government can occur by establishing frequent, regular communications with counterparts of other local governments and especially with peers in other organizations, e.g., health, academic, private sector, etc. Such regularly scheduled meetings provide a forum for the

exchange of new ideas and collaborative problem solving which may foster experimentation and adoption of sustainability efforts.

Another path that practitioners should consider consists of implementing a program that engenders on-going organizational evaluation and improvement as well as strategic planning. Establishing an organizational culture of on-going evaluation and improvement creates an atmosphere conducive for identifying more sustainable provision of services. An active strategic planning program, i.e., a program consisting of planning, implementing, evaluating and reorienting, is another way of enhancing the prospects for sustainability because the strategic planning process allows the local government to consider how best to adjust to changes occurring in the community, natural environment, and economy. For example, a strategic planning process may foster sustainability at the local government level by identifying what economic activities and opportunities the community finds acceptable and unacceptable. Such knowledge allows local government officials to tailor economic development efforts that are more calibrated to community needs and desires, such as affordable housing, healthy environment and livable wages. In addition, Florida (2005) found that firms are attracted to places that have well-educated workforces and are accepting of diversity in its many forms, e.g., viewpoints and ideas, racial, ethnic, cultural etc. As leaders within their communities, local government officials can lead by example and by persuasion to create communities that are more open to diversity in its many forms and thereby create more sustainable local economies.

The categories of variables, New Political Culture and Community Well-Being identified the importance of a community's educational attainment and wealth as a factor in the pursuit of sustainability by local governments. In terms of education, local government officials should consider methods that enhance workforce development of their own employees as well as the general community. Such methods could include partnerships with local community colleges, state workforce development efforts and support of local K-12 educational funding, Local governments may assist the creation of wealth through economic development efforts that first focus on keeping existing businesses in business, and when seeking new businesses to locate within the community, ensuring that such prospects pay livable wages, are more likely to hire locally, do not create more costs than revenue generated to pay for their associated infrastructure, policing, and emergency ambulance response needs. And finally, are export oriented because of the stronger job creation potential of such firms.

The Political Party Affiliation category highlighted the importance of language and terminology when discussing sustainability. For instance, certain terms such as climate change and global warming have become highly politicized and thus much harder to address. Practitioners should consider changing the language used when discussing sustainability from an environmental perspective to one that emphasizes the benefits of sustainability programs and practices to the community, among these being, affordable housing, stable jobs paying livable wages, safe streets and neighborhoods and tax savings through more effective and efficient services. After all, these are the very same things every local government official says they're in favor of.

Local government officials have numerous means of helping to develop more sustainable communities. There efforts should begin with considering those activities which they control and leading by example. By focusing time and energy on making local government activities which they manage more sustainable, more sustainable communities will result.

6.9 Summation

Local governments have the necessary powers and responsibilities to build sustainable communities. This fact was recognized long ago in Agenda 21, yet twenty years later the majority of local governments are not pursuing sustainability efforts. Much work remains to be accomplished to understand why, especially since sustainability achieves what all local government officials claim to want: good jobs, healthy environment and stable community. This research sought to cast more light on the variables that foster sustainability at the local government level may help more local governments pursue such efforts. The research identified the important roles of institutional resources such as effective planning documents in the pursuit of sustainability. The research also identified the important roles that institutional setting, political party affiliation and willingness to accept new ideas have in the fostering sustainability at the local government level. These findings mirror previous research. More research in necessary to determine whether or not the variable of collaboration is important. And the research plowed new ground by considering how the pursuit of sustainability is taking place in rural areas. With further research to understand how these variables relate to sustainability at the local government level it may be possible to develop an approach that energizes our nation's local governments to undertake the work of sustainability and thereby reduce the threats that climate change is to our society.

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Appendix 1 Pilot Study

A1.1 Introduction

An exploratory "pilot" study was undertaken in order to identify variables and the relationships that foster local government pursuit of sustainability. The pilot study also served as a vehicle to test data collection techniques and identify data sources. Appendix 1 consists of the entire Pilot Study report.

A1.1 Methods

Two Alaska local governments comprised the sample for the exploratory study. The two local governments were selected based on form of government (manager versus mayor) and pursuit of sustainability efforts (pursuit and no pursuit). At the time that the study took place, both were offered source confidentiality because it was believed to be important to participation especially since it was expected that one local government pursued sustainability efforts while the other not. Both local governments were contacted after the study was completed and requested to waive the confidentiality; one agreed and one failed to respond after numerous requests. The two local governments are therefore identified as AK1 and AK2.

Both are located in south-central Alaska, on the road system, and have populations in the range of 2,500 to 10,000 people. Both are organized under state law as first class cities. The general functions of both cities include: public works and facilities, water and wastewater, planning (but not platting), economic development, library, and police as well as those functions necessary to support these services such as finance (but not tax assessment) and administration. Neither city provides solid waste services, the service being handled by their respective boroughs. For each city the sales tax is the major source of revenue. AK1 is a manager form of government, while AK2 is a mayoral form of government. In a manager form of government, the manager is appointed by the governing body (i.e., city council), is responsible for implementing the governing body's policies, and is the chief executive officer. In the mayoral form of government the mayor is directly elected by the citizens, initiates and implements policy, and is the chief executive officer. The two local governments are small in terms of employee size, community size, and relative financial capacity. Table A1.1 describes the key characteristics of each local government.

Table A1.1. Sample Characteristics

Category	AK1	AK2
Form of government	First Class, Manager	First Class, Mayor
Number of employees (Full Time Equivalent)	110.8	115.5
Population	2,500 - 10,000	2,500 - 10,000
Land size	10.6 sq.mi.	12.4 sq.mi.
Location	Coastal; south-central	Inland; south-central

Data were collected in four ways. A computer-based questionnaire was used for a portion of the data. Interviews with the mayor, manager, and planning directors were conducted in the Fall of 2012 and early Spring of 2013. City documents, such as ordinances, resolutions, plans, budgets, and audits were collected and analyzed during the same timeframe. In addition, voting records from the State of Alaska, Division of Elections (2013a) were collected and analyzed for state and federal elections held from 2000 to 2012. Other data, such as extreme weather events and demographic characteristics, was also collected and analyzed from relevant federal and State of Alaska agency databases.

The term sustainability is the focus of this study and is defined to mean actions taken today that may enhance a community's resiliency and well-being while not precluding opportunities of future generations. A local government takes actions by implementing programs and practices within the three pillars of sustainability: environment, economy, and equity as illustrated in Figure A1.1. Moreover, a program implemented by a local government may address more than one pillar of sustainability and have multiple desired outcomes.

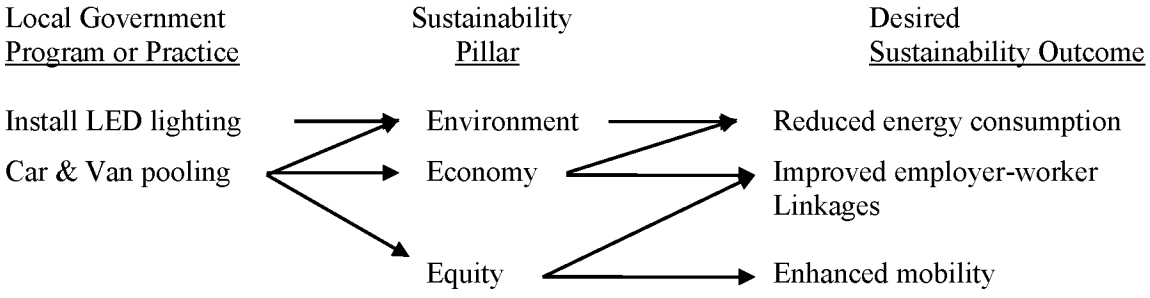

Figure A1.1. Pillars of Sustainability and Local Government Programs/Practices

The study used a definition to distinguish between local governments that practice sustainability and those that do not. The definition is: A sustainable city is one that adopts sustainability rules, such as ordinances and policies, and implements sustainability efforts as evidenced by budgets, assigned personnel, design standards, etc.

The study collected data on both independent and dependent variables (see Figure A1.2). The dependent variable is sustainability, as defined above. The study also evaluated independent variables within four categories that are believed to explain whether or not a city pursues sustainability. The four categories are: 1) community context, 2) institutional setting, 3) natural environment and 4) polycentric collaboration. I used scorecards to determine whether or not the city was pursuing sustainability. Sustainability scorecards are commonly used to describe the extent to which an organization pursues sustainable programs and practices. The scorecards also provide information on various aspects of a city's pursuit of sustainability such as use of formal or informal methods, amount of organizational support, type of sustainability program(s), and intensity of effort. The final scores provide an indication of where a city lies on a continuum of sustainability programs and practices, ranging from no detectable efforts to pursuit of a comprehensive set.

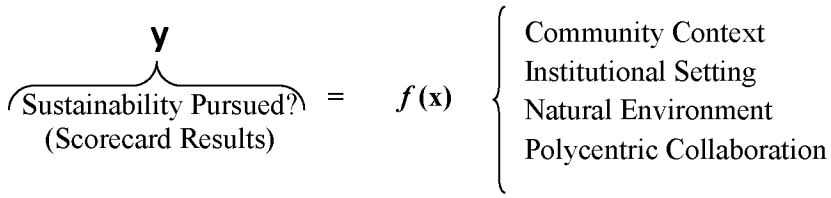

Figure A1.2. Pursuit of Sustainability is a function of Four Variable Categories

Two scorecards were used in the pilot study. The first scorecard was developed by the author and seeks to answer the questions "Is the local government pursuing sustainability? And "If so, in a formal or informal manner?" Formal adoption methods consist of actions that are considered and approved by the city's governing body; such as ordinances, resolutions, and budgets. Informal adoption methods do not receive a city's governing body's consideration and are administrative in nature such as operating procedures and policies.

The second scorecard was adapted from the Association for the Advancement of Sustainability in Higher Education (ASHE) named the Sustainability Tracking and Assessment System (STAR) (Association for the Advancement of Sustainability in Higher Education, 2011). This scorecard seeks to answer the questions "How well is the local government pursuing

sustainability in terms of level of effort or implementation intensity? And "In what areas is the local government pursuing sustainability?" The STAR scorecard results are shown in Table A1.3. By using the two scorecards, we can determine whether or not a local government is "saying all the rights things" yet failing to do any real work on sustainability. The two scorecards also provide insight on whether formal or informal adoption measures make a difference in the pursuit of sustainability. The scorecards calculation procedures are shown in Appendices 1 and 2, respectively.

A1.2 Results

As illustrated in Table A1.2, there is a stark contrast between AK1 and AK2 for all sustainability attributes considered by scorecard #1. For instance, AK1 had strong evidence of both formal adoption methods (e.g., adopted ordinances, budget line items, adopted plans, revolving loan bank) and informal adoption methods (e.g., managerial policies) that are directly related to the implementation of sustainability. The review of AK2's archival records, questionnaire responses, and interviews provide no indication of formal or informal methods. In addition, AK1's planning documents make explicit mention of all three pillars of sustainability (economic, ecological, and equity) while AK2's planning documents make no mention of sustainability. In terms of budgetary and personnel support, AK1 has evidence of budgetary line items, revolving loan funds, and employee orientation handbooks all related to sustainability; once again, AK2 has no evidence of budgetary and personnel support of sustainability. Neither city has evidence for the use of benchmarks or targets, a somewhat surprising finding in the case of AK1 due to its high marks on all other scorecard attributes and the fact that use of performance measures is considered a professional hallmark of effective government management.

The STAR scorecard provides a means for rating the respective sustainability efforts of each local government. We have seen from the scorecard #1 that AK2 isn't pursuing sustainability programs or practices; it is therefore not surprising that its STAR scorecard results are near zero, specifically, 2. Thus, the discussion of the STAR results is focused on AK1. The STAR scorecard in Table A1.3 indicates that AK1 sustainability efforts are directed to the energy and environmental related categories plus organizational efforts in support of sustainability.

Table A1.2. Scorecard #1 Results

Attribute	Rating	Max Points	AK1 Score	AK2 Score
Formal Adoption Method	Evidence within adopted ordinances, resolutions, polices, plans	4	4	0
Informal Adoption Methods	Described in executive directives, polices, plans	4	1	0
Pillars of Sustainability (ecological, economic and equity)	Number addressed and use of explicit narrative to explain pillars	4	3	0
Implementation Effort	Amount of implementation	3	2	0
Monitoring & Level of Effort	Use of benchmarks, indicators, or targets	3	0	0
Number of Focus Areas Addressed (e.g., air quality is a focus area of the environmental pillar, affordable housing is a focus area of the equity pillar)	Number of categories	3	3	0
Budgetary& Personnel Support	Evidence of funds and staff dedicated to sustainability efforts	9	6	0
	Total	38	19 (50%)	0 (0%)

The focus on energy is not surprising since energy efficiency has direct effects on a city's operating budget and indirectly on tax levies; thus, energy savings create rewards from constituents and citizens. AK1 also earned most of the points available for energy-related items indicating that its level of effort in this category is significant and focused. Two other aspects of AK1's efforts are noteworthy: planning and organizational efforts. These aspects of AK1's efforts provide a foundation for long-term achievement. For instance, the points scored for comprehensive and climate action plans indicate governing body and community support for sustainability actions which would provide a firm basis for future action in other areas such as economic and equity. Moreover, the points AK1 earned (5) in intra-organizational categories indicates that sustainability is an organizational priority resulting in stronger institutional focus and learning in support of sustainability efforts.

Table A1.3. STAR Scorecard Results

Possible Sustainability Efforts	Possible Points	AK1's Score	AK2's Score
Building Operations and Maintenance	7	4	0
Building Design and Construction	4	4	0
Indoor Air Quality	2	0	0
Greenhouse Gas Emissions Inventory	2	2	0
Greenhouse Gas Emissions Reduction	14	7	0
Food Purchasing	6	0	0
Building Energy Consumption	8	4	0
Renewable Energy	7	3	0
Computer Purchasing	2	0	0
Cleaning Product Purchasing	2	0	0
Office Paper Purchasing	2	0	0
Vendor Code of Conduct	1	0	0
Municipal Fleet	2	2	0
Employee Modal Split	3	0	0
Waste Reduction	5	0	0
Construction and Demolition Waste Diversion	1	0	0
Electronic Waste Recycling Program	1	0	0
Hazardous Waste Management	1	0	0
Water Consumption	7	0	0
Stormwater Management	2	2	0
Sustainability Coordination	3	1	0
Strategic Plan	6	0	0
Comprehensive Plan	4	4	1
Sustainability Plan	3	0	0
Climate Plan	2	2	0
Diversity and Equity Coordination	2	0	0
Measuring Municipal Workplace Diversity Culture	2	0	0
Support Programs for Underrepresented Groups	2	1	1
Support Programs for Future Employees	4	2	0
Affordability and Access Programs	3	0	0
Sustainable Compensation	8	0	0
Employee Satisfaction Evaluation	2	0	0
Staff Professional Development in Sustainability	2	1	0
Sustainability in New Employee Orientation	2	2	0
Employee Sustainability Educators Program	5	0	0
Committee Socially Responsible Investment	2	0	0
Shareholder Advocacy	5	0	0
Positive Sustainability Investments	9	0	0
Community Sustainability Partnerships	2	2	0
Inter-municipal Collaboration on Sustainability	2	0	0
Sustainability in Continuing Education	7	0	0
Community Service Participation	6	0	0
Community Service Hours	6	0	0
Sustainability Policy Advocacy	4	4	0
Trademark Licensing	4	0	0
Total	100	47 (47%)	2 (2%)

Employees who engage in sustainability efforts at AK1 do so with the full blessing of the organization rather than as wildcatters as evidenced by formal actions by the governing body, administrative policies and employee orientation manuals. Thus, sustainability accomplishments are much more likely and will be shared throughout the organization.

The STAR scorecard results also identify two areas that are ignored by both cities: water consumption and purchasing, even though these categories may provide major cost savings and environmental benefits. Providing clean water is energy intensive, thus expensive, because it requires front-end and back-end purification facilities and distribution and collection systems. Failing to seek more sustainable methods of addressing water consumption may be partially explained by the large number of on-site wells and septic systems in both communities, yet nevertheless, each city operates standard municipal water systems so there should be some focus on sustainable water consumption. Moreover, no evidence was found in either city for better management of on-site wells and septic systems in terms of: 1) water consumption management, 2) criteria for adequate water as a requirement of parcel development, or 3) statutory provisions for septic system pumping.

The other area ignored by both municipalities is environmental (i.e., sustainable) purchasing procedures (EPP). Local governments regularly purchase large quantities of products and supplies for lighting, cleaning, and heating; they also purchase equipment and materials such as windows, roofing, and paving. Sizeable cost savings and environmental benefits are achieved by use of EPP which in turn places the city on a more sustainable path by strengthening fiscal stability and reducing waste.

Once again, the purpose of the scorecards is to determine whether or not AK1 and AK2 are pursuing sustainability efforts, and if so, how. The results of the scorecards, given as percentages in Table A1.4, indicate that AK1 received 48% of the points possible while AK2

Table A1.4. Summary of Sustainability Scorecard Scores

Scorecard	Points Possible	AK1 Points	AK2 Points
Scorecard #1 Results	38	19 (50%)	0 (0%)
STAR Scorecard Results	100	47 (47%)	2 (2%)
Total	138	66 (48%)	2 (1%)

received just 1% of the points possible. Thus AK1 is pursuing sustainability efforts and also meets my definition of a sustainable place while AK2 does not. Armed with the knowledge that

AK1 pursues sustainability while AK2 does not, we now turn to possible explanations for why the cities behave so differently. To understand the different behaviors, variables identified in previous research and of personal interest were identified and data collected for analysis. The variables were arranged into four categories, an approach used by Saha (2009b). The four categories include community context, institutional setting, natural environment, and polycentric collaboration. The following paragraphs present the results of the independent variable categories considered in this study.

A1.1.1 Community Context

The category, Community Context, describes community attributes such as demographic and locational characteristics. These attributes are based on a review of the literature. Previous research has shown a positive relationship between local government sustainability and population growth, (Conroy & Iqbal, 2009; Saha, 2009b), age (Saha, 2009b), creative class composition (Budd, Lovrich Jr., Pierce, & Chamberlain, 2008), decennial population change (Conroy & Iqbal, 2009), education (Portney & Berry, 2010; Saha, 2009b; White & Boswell, 2007), median household income (Conroy & Iqbal, 2009), racially homogenous population (Saha, 2009b), and new political culture (Saha, 2009b). One other variable, manufacturing occupation (Portney, 2003), was shown to have a negative relationship with local government sustainability. Data for the variable decennial population change was collected from the U.S. Census Bureau (2000, 2010); all other demographic data, unless otherwise noted, was collected from the American Community Survey (ACS) 2007-2011 (2011) (Table A1.5).

For all variables, with the exception of manufacturing occupations and new political culture, AK1's population characteristics are more predisposed to local government pursuit of sustainability than AK2. In addition, AK1 has higher percentages of establishments and occupations within the Arts, Entertainment and Accommodations, and Self-employed categories, proxies for the variable "creative class" (Florida, 2002; U.S. Department of Agriculture, 2013).

The demographic variables related to decennial population change and household residency were analyzed to determine if length of residency within a community might have a relationship with local government pursuit of sustainability. Both cities show high population growth for the 2000 to 2010 decade with AK2 being exceptionally high with 30% more new residents. In terms of household residency, however, AK1's population revealed a larger number of households with longer tenure in the community.

Table A1.5. Community Context Variables Associated with Sustainability

Variable (all are postulated to have a positive correlation with sustainability except Manufacturing)	AK1	AK2	Difference
Population change 2000 - 2010	21.1%	30.2%	+9.1% AK2
Population 25 years of age or more - High School Graduate	95.9%	90.8%	+5.1% AK1
Population 25 years of age or more w/ Bachelor's degree or higher	33.5%	20.6%	+12.9% AK1
Population 20-44 years of age	27.9%	32.7%	+4.8% AK2
Unmarried and non-traditional households	17%	20.2%	+3.2% AK2
Per capita income	$31,471	$29,006	+8.5% AK1
Median Household Income	$55,603	$53,433	+4.1% AK1
Population at and below poverty	8.5%	12.8%	+4.3% AK2
Household residency - 1999 and longer	33.8%	26.9%	+6.9% AK1
One race (% of total population)	97.9%	93.3%	+4.6% AK1
Occupation: Professional, scientific, technical, education	32.7%	32%	+0.2% AK2
Female in labor force	56.2%	58.8%	+2.6% AK2
Occupation: Agriculture, forestry, fishing, hunting	8.1%	4.8%	+3.3% AK1
Occupation: Arts, entertainment, accommodations	12.0%	4.8%	+7.2% AK1
Self-employed	17.3%	5.7%	+11.6% AK1
Establishments: Arts, entertainment, accommodations	5.5%	2.6%	+2.9% AK1
Occupation: Manufacturing (negative relationship)	3.2%	1.7%	+1.5% AK1

Source: U.S. Census Bureau (2000, 2010, 2011).

New political culture is an index developed by Saha (2009b) that measures the receptivity of a community to new initiatives and thus, whether a community is more receptive to pursuit of sustainability measures. The index is comprised of standardized scores of six demographic variables: percentage of unmarried and non-traditional households, percentage of population between the ages of 18 and 44 (the ACS category is 20-44), percentage of population aged 25 years of more with a Bachelor's degree, percentage of female participation in the labor force, and percentage of the labor force in the professional, scientific, technical, education occupations. While a standardized score was not computed, a comparison of the census data reveals that AK2's population has higher percentages for five of the six variables used in the index; the exception being percentage of population aged 25 years or more with a Bachelor's degree.

For other contextual variables (Table A1.6), data were collected from questionnaires, interviews, and the State of Alaska, Division of Election. The results for this group of contextual variables also show distinctions between AK1 and AK2. For instance, on two variables: existence

of a community based non-governmental organization focused on sustainability and support by the governing body and senior management, AK1 has a higher rating - meaning stronger support for sustainability.

Table A1.6. Community Context Variables Supporting Sustainability Actions

Variable	Points Possible	AK1	AK2
NGO dedicated to sustainability	1	1	0
Strong tax payer group (opposed to increases in taxes)	1	0	1
Evidence of Democratic Party voting (based on state and national election results: 2000 through 2010)	1	1	0
Amount of social capital: existence of NGOs, community-based support groups, health care services, etc.	1	1	1
Support of governing body and senior management for sustainability (from survey responses)	1	1	0
Site of a major university	1	0	0
Direct citizen participation (e.g., number of citizen-based petitions, initiatives, and referendums).	1	0	0
Evidence=1, No Evidence=0 Total	7	5 (71%)	2 (29%)

Innovation also has a role in sustainability. An innovation is defined as a practice, policy or program that is new to the adopting organization (Schneider, 2007). Since sustainability represents a new approach for many local governments it may therefore be considered an innovation. Consequently, contextual variables from the literature of local government and innovation were reviewed for their potential relationship with local government pursuit of sustainability. Franzel (2008) identified four variables having a relationship with innovation at the local government level; these being, voting preferences, evidence of a strong taxpayers group, direct citizen participation, and evidence of a sustainability focused non-government organization. Johnson & White (2010) in their study of the role that innovation played in advancing sustainable transportation practices by local governments in the Kansas City metropolitan area focused on the variable diffusion.

To test the relationship of voting preferences, State of Alaska, Division of Elections records were consulted for votes cast for state and federal elective offices for elections during 2000 and 2012. As shown in Table A1.7, both AK1 and AK2 demonstrate a preference for Republican Party candidates for all offices during this period with the lone exception of AK1's

2006 gubernatorial election. Both AK1 precincts and AK2 precincts may be characterized as being uncompetitive and Republican Party dominated, with AK2's having much wider margins.

Table A1.7. Party Voting Characteristics 2000-2012

	2000 Presidential Vote	2002 Gubernatorial Vote	2004 Presidential Vote	2006 Gubernatorial Vote	2008 Presidential Vote	2010 Gubernatorial Vote	2012 Presidential Vote
AK1							
Democratic Party Votes	27.8%	46.3%	43.0%	44.9%	41.2%	47.3%	44.5%
Republican Party Votes	50.9%	50.9%	52.5%	43.5%	50.7%	50.7%	50.0%
AK2							
Democratic Party Votes	19.1%	25.6%	22.6%	18.4%	18.4%	26.0%	23.9%
Republican Party Votes	67.8%	70.2%	74.6%	79.6%	79.6%	71.2%	71.0%

Source: State of Alaska, Division of Elections (2013).

A1.2.2 Institutional Setting

The category, Institutional Setting, contains variables related to a local government's ability and willingness to undertake sustainability programs. Prior research indicates that a local government's ability to pursue sustainability efforts is related to its financial and personnel capacity (Pini, River & McKenzie, 2007; Parkinson & Roseland, 2002), planning documents (Herman, 2010; Mercer & Jotkowitz, 2000), senior government mandates (Parkinson & Roseland, 2002, Saha, 2009b), stability in terms of governing body and senior management turnover rates and recall measures (Johnson & White 2010), support of governing body and senior management for sustainability (Parkinson & Roseland, 2002), and use of annual reports (Mercer & Jotkowitz, 2000). The literature reports mixed results on a relationship between pursuit of sustainability and the council-manager form of government as opposed to mayor-council form. Teodoro (2009) reported a positive relationship for the council-manager form, while Saha (2009b) did not find any relationship; nevertheless, the variable is included here for analysis. Data for these variables were collected from the following sources: survey questionnaires, interviews, and archival records.

Institutional variables for the municipalities reveal similarities and contrasts (see Table A1.8). In terms of similarities, both municipalities have the core elements found in capably managed local governments. For instance, each city had independent audits with no findings; each had received the Government Financial Officers Association's Excellence in Financial reporting statement, both had issued annual reports describing the prior year's accomplishments, and each

had very low turnover rates for their governing bodies, mayor/manager, and senior management. Furthermore, each city had adopted comprehensive plans, functional plans, and hazards mitigation plans. Moreover, the comprehensive and hazards mitigation plans of both municipalities were developed in accordance with the general standards described by Duerksen, Dale, and Elliott, (2009) and Federal Emergency Management Agency (2013). In addition, as First Class cities, each has the requisite legal authority to address most environmental matters within their boundaries.

The cities are also similar in what is absent from their portfolios. Neither had: any historical or pending environmental justice issues, an adopted strategic plan, or evidence of an ongoing effort of reviewing the effectiveness and efficiency of the services they provide through the use of annual household surveys or trend analysis of performance metrics. The cities' core functions, financial and personnel capacities and general operating methods are basically the same. Each city's has a sound financial base as measured by total expenditures, total revenues, revenue diversity stream, long-term debt, and unrestricted fund balances (see Table A1.9). An exception; however, is AK1's debt burden which is higher than AK2's and exceeds two common municipal financial standards, debt burden per capita and debt burden per capita income (Leonard, 2004). Lastly, each city's mayor, manager, and senior management have long tenure in their positions and advanced professional and/or academic degrees.

There are differences between AK1 and AK2 as well. One difference between the two cities is their respective form of government. AK1 is a manager form of government while AK2 is a mayoral form of government. The other difference between the cities is their implementation efforts. As discussed above, only AK1 is implementing sustainability efforts as measured by the adoption of plans that include sustainability measures, dedication of financial resources, and workplace procedures (e.g., employee orientation).

Table A1.8. Institutional Setting Variables

Variable	Points Possible	AK1	AK2
Adopted comprehensive plan	1	1	1
Adopted functional plan(s) (e.g., transportation, trails, etc.)	1	1	1
Adopted budgets with financial reserves.	1	1	1
Adopted ordinance and/or resolution supporting sustainability measures	1	1	0
Adopted internal policies and procedures.	1	1	1
Adopted strategic plan	1	0	0
Sustainability is formally incorporated within work processes	1	1	0
Culture of environmental responsibility (e.g., number of actions - studies, plans, policies, ordinances, etc.- addressing environmental or natural resource issues)	1	1	0
Formal environmental justice efforts (e.g., evidence of environmental justice-based legal actions; mention of environmental justice in plans or actions taken to address environmental justice matters)	1	0	0
Availability of funding and personnel for sustainability activities (e.g., evidence of budget line items and personnel directed towards sustainability efforts)	1	1	0
Adequacy of environmental powers (i.e., does city have the requisite statutory powers to address environmental matters)	1	1	1
Commitment to sustainability (e.g., narratives and statements are followed by resources and implementation occurs)	1	1	0
Form of government (Manager=1, Mayor=0)	1	1	0
Organizational reputation (e.g., awards/recognition for sustainability efforts)	1	0	0
Stability (e.g., turnover rates of governing body and senior management)	1	1	1
Annual performance/operations reports.	1	1	1
Adopted resource management strategies (e.g., adopted plans and policies addressing resource management issues)	1	1	0
Adopted conservation strategy (e.g., adopted plan and policies addressing conservation of a natural resource such as open space or farm land)	1	1	0
Adopted sustainability action plan (e.g., a document that specifically identifies sustainability efforts and how these efforts will be accomplished. Conservation and resource management plans may be evidence of sustainability actions or implementation)	1	1	0
Reflective organization (e.g., metrics and/or citizen-based surveys used to identify service improvements, use of best practices, etc.)	1	0	0
State-level land use planning mandates (beyond general requirement for comprehensive plans)	1	0	0
Evidence=1, No Evidence=0 Total	21	16 (76%)	7 (33%)

Table A1.9. Comparison of Financial Characteristics- Fiscal Year 2011

Category	AK1	AK2
Total Expenditures per capita	$2,038	$1,962
Total Revenues per capita	$2,271	$2,372
Total net assessed value	$603,338,212	$875,447,170
Real property tax (% of total revenues)	Yes (28.5%)	No
Sales tax (rate, % of total revenues)	Yes (4.5%, 42.1%)	Yes (2.5%, 64.2%)
Other sources (% of total revenues)	Yes (29.4%)	Yes (35.8%)
Outstanding debt per capita	$3,242	$761
Statutory limit on debt?	No	No
Debt burden >10% of assessed value?	No	No
Debt burden per capita > $1,429?	Yes	No
Debt burden >15% of per capita income?	Yes	No
Unrestricted fund balance	$6,214,562	$7,293,632

Sources: AK1 and AK2 Comprehensive Audit Statement for Fiscal Year 2011

A1.2.3 Natural Environment

Natural environment is the third category of variables to be considered for its relationship with local government pursuit of sustainability. Variables within the natural environment category include city policies related to sustainability that are commonly included in local sustainability plans such as those addressing air and water quality (city of El Paso, 2009; city of Keene, 2007; city of Santa Monica, 2006; county of Carroll, 2010; county of Fairfax, 2007), environmental conditions that affect citizen perception on the reality of climate changes such as local climate conditions and extreme weather (Hansen, Satoa, & Ruedy, 2012; Myers, Maibach, Roser-Renouf, Akerlof, & Leiserowitz, 2012; Owen, Conover, & Julio, 2012; Schwartz, 2010), and formally designated pollution sites commonly known as Superfund and Brownfield sites (Lubell et al., 2009).

One other variable, hazard mitigation efforts, is also included in the natural environment category because contemporary disaster preparedness efforts stress the need for addressing: extreme weather events, climate change adaptation measures, and disaster resistant development techniques (Federal Emergency Management Agency, 2013; Intergovernmental Panel on Climate Change, 2012; Moss, Meehl, & Lemos, 2013; National Oceanic and Atmospheric Administration [NOAA], 2010). Hazard mitigation efforts may be considered an indicator of sustainability because they recognize the potential effects of pollution, extreme weather and other hazards and prescribe actions to reduce exposure help make communities more disaster resilient and therefore sustainable.

Identifying extreme weather events presents challenges. The literature defines extreme weather events as those occurrences that are outside (statistically significant) of historical averages (NOAA, 2013). Local governments, however, view extreme weather events in a different light, such as by the level of emergency and fiscal response that is necessary to address the effects on the community. Therefore, additional locally-based indicators of extreme weather, such as whether or not an emergency operations center is activated or a formally adopted disaster declaration is issued, are used to identify the existence and influence, if any, of extreme weather events.

AK1 and AK2 do not contain any EPA designated Superfund or Brownfield sites (see Table A1.10). AK1 does have a recent history of high winds and coastal erosion. Indeed, the concern of coastal erosion was raised during the interviews and there have been several studies and mapping projects completed to measure the erosion threat. For instance, AK1 has prepared a Suitability Map identifying lands with features that require special development measures to reduce hazards, e.g., erosion, flood, subsidence. Flooding, storm surges, and coastal erosion, are the major environmental hazards that AK1 has and continues to address. There were two formally declared disasters in AK1 during the 2000 to 2012 timeframe and several "minor" disasters (events requiring local emergency response but without formal disaster declaration) consisting of flooding and storm surges. On the other hand, AK2 is not addressing any major environmentally related matter other than an EPA requirement to upgrade its wastewater system. During the 2000 to 2013 timeframe AK2 did not have any formal or informal natural or human caused disasters, though it did have several high wind events.

Table A1.10. Environmental Variables Supporting Sustainability Actions

Variable		Count	AK1	AK2
Prior history of extreme weather events			1	0
Identified environmental hazard			1	0
Superfund or Brownfield site			0	0
Poor air quality or air pollution issue			0	0
Poor water quality or water pollution issue			0	0
Adopted documents/plans address sustainable development practices that address the environment and disaster avoidance			1	0
Adopted policies/regulations include precautionary or hazard reduction			1	0
Hazard mitigation plan addresses extreme weather and/or is above average in contents (e.g., goes beyond voluntary recommendations to include relevant actionable items)			1	0
Previous documented disaster (natural-, human-, technological-caused) w/ emergency response			0	0
Evidence=1, No Evidence=0	Total	9	5 (56%)	0 (0%)

As a consequence of the extreme weather and historic erosion patterns, AK1 has invested in environmental studies and adopted plans and policies that seek to minimize future damage. For instance AK1 has prepared a community design manual, development suitability map, coastal erosion study, stormwater and meltwater management and mitigation handbook and tsunami hazards study. AK2 has not completed such work. Moreover, AK1's hazards mitigation plan thoroughly and proactively addresses extreme weather events and other associated natural hazards. In comparison, AK2's plans and policies are almost silent on the issue of extreme weather. Furthermore, AK2's hazards mitigation plan is unassertive on measures and recommendations addressing extreme weather or natural hazards. Looking across the spectrum of the natural environment variables but especially those related to natural hazards and extreme weather, AK1 has taken more action on environmental issues than AK2.

A1.2.4 Polycentric Collaboration

Polycentric collaboration consists of the relationships and collaborations of multiple authorities with overlapping jurisdictions (Andersson & Ostrom, 2008). Polycentric collaboration occurs on multiple scales (Ostrom, 2010); a vertical scale when a city collaborates with higher and lower levels of government as well as on a horizontal scale when local governments communicate with other organizations such as other cities, non-government organizations, and academic institutions. Polycentric collaboration creates the conditions for the sharing of information and the transfer and diffusion of new ideas and innovations (Ostrom). Variables

associated with polycentric collaboration measure the amount of partnering and information sharing that a city undertakes with other municipalities and organizations (see Table A1.11).

In the area of land use planning and sustainability there is a general lack of senior government mandates in Alaska. For instance, State of Alaska has not issued any statutory mandates requiring planning effort related to sustainability such as urban service area boundaries, climate change adaptation, or smart growth techniques. In fact, Alaska has only a basic land use planning mandate requiring that a city develop a comprehensive plan which may include "statements of policies, goals, and standards; a land use plan; a community facilities plan; a transportation plan; and recommendations for implementation" (State of Alaska, 2013b).

Table A1.11. Polycentric Collaboration System Variables Supporting Sustainability Actions

Variable	**Points Possible**	**AK1**	**AK2**
Senior government mandates.(e.g., state or federal regulations or stipulations)	1	0	0
Membership in state municipal organizations	1	1	1
Membership in national professional organizations	1	0	0
Membership in sustainability related organizations	1	1	0
Use of sustainability related "best practices" (best practices are examples of successful implementation efforts by other local governments)	1	0	0
Existence of a community based NGO dedicated to sustainability	1	1	0
Regular collaboration with state and federal agencies on sustainability and/or resource management matters	1	1	0
Evidence=1, No Evidence=0 Total	9	4 (44%)	1 (11%)

The potential for polycentric collaboration exists for both municipalities as both cities are members of the Alaska Municipal League and AK1 is a member of the International Council for Local Government Initiatives though AK2 is not a member. Neither city's chief executive officer is a member of their respective professional organization, i.e., the International City/County Managers Association and US Conference of Mayors.

Another indicator of polycentric collaboration is the work both cities have undertaken with federal agencies and non-governmental organizations. Both cities have worked with the Federal Emergency Management Agency to develop hazard mitigation plans. However, AK1 worked with other federal include areas related to their sustainability efforts such as coastal erosion, hazard mitigation, and wetland mitigation planning. AK1 also worked with a local non-governmental organization on sustainability. AK2's did not evidence any similar level of effort in

this category. Neither city, though, indicated any use of sustainability "best practices" from other local governments, a common transfer of knowledge process.

The results of the six measures of sustainability are summarized in Table A1.12 and illustrated in Figure A1.3. As discussed previously, AK1 has higher ratings for both scorecards and all categories of variables.

Table A1.12. Comparison of Six Sustainability Measures

Sustainability Measure	AK1	AK2
Scorecard #1	50%	0%
Scorecard #2	47%	2%
Community Context	71%	29%
Institutional Setting	76%	33%
Natural Environment	56%	0%
Polycentric Collaboration	44%	11%

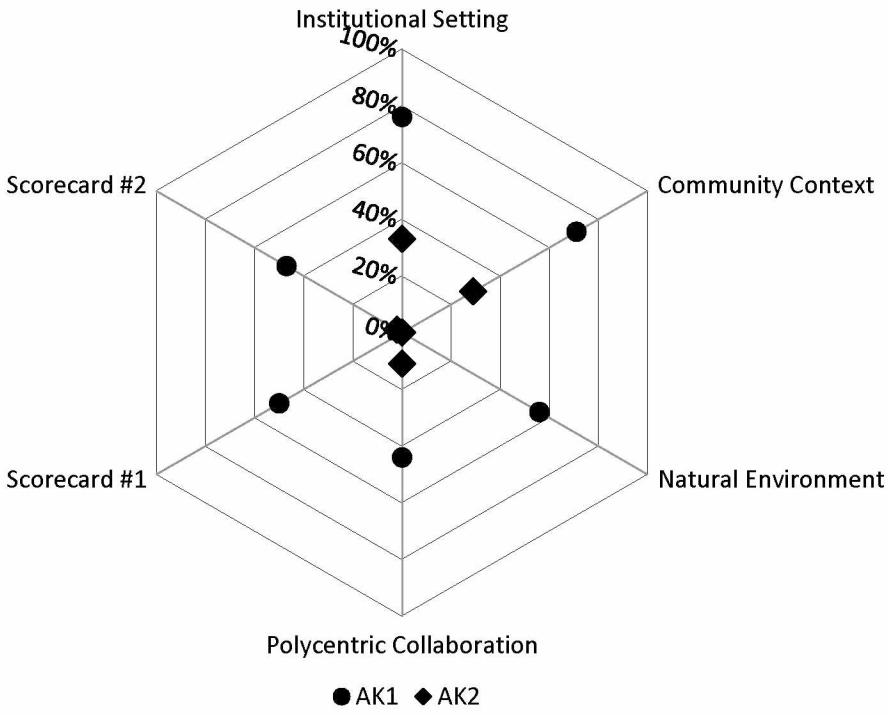

Figure A1.3. Continua of Local Government Sustainability

A1.2 Discussion

The pilot study yielded clues as to why AK1 is pursuing sustainability while AK2 does not. The research also created more questions, as some variables identified in the literature to be positively associated with local government sustainability were found not to have the reported relationship. It also appears that some categories of variables may have stronger influence than others. Even with the questions and uneven influence of each variable category, the study does point to certain conditions that explain AK1's interest in sustainability and AK's disinterest.

For the category, community context, the likelihood that the community will adopt sustainability measures is increased when the community is comprised of more long-term residents having above average education and income levels, and a significant amount of self-employment and employment in the arts, entertainment, accommodations and natural resource, (e.g., fishing) sectors (Conroy & Iqab, 2009; Portney & Berry, 2010; Saha, 2009b; White & Boswell, 2007). Communities with these characteristics are more receptive to new practices. These findings echo the results of previous studies.

This study also found conflicting results. One such finding is that AK1 has a higher number of its labor force employed in manufacturing even though communities with a large manufacturing component have been found in previous research (Portney, 2003) to have a negative relationship with local government sustainability efforts. The contrary finding of AK1 might be explained by the type of manufacturing taking place. AK1's manufacturing is related to natural resource production, such as fish processing, while previous findings have focused on non-food manufacturing. The difference in the type of manufacturing may explain the anomaly since fish processing is directly linked to the natural environment; hence, employees may have higher interest in a clean, sustainable environment.

Similarly, communities with population characteristics favorable to a new political culture and increased population are associated with local government sustainability (Saha, 2009b). Census data, however, indicate that AK2's population has a higher amount of its population meeting the new political culture characteristics and that it had an above average growth in population, some 30% in just ten years. These contrary findings might be due to the existence of a strong (anti) tax payer group and high Republican Party voting patterns in AK2 which might cancel any positive effect towards sustainability associated with the variable new political culture. And it may also be that above average rates of population increase, as found in AK2, creates destabilizing conditions within the community and thus more difficulty for a new political culture to be formed.

The two cities have similar financial and non-financial resource capacities to undertake sustainability programs and practices. For instance, each has a strong financial base, diverse revenue sources, strong financial reserves, manageable long-term debt obligations, and professionally trained and long-tenured senior management. Perhaps these aforementioned variables are foundational requirements and necessarily antecedent for other institutional variables to positively influence a local government towards sustainability.

Another difference between the two cities is the activities in support of sustainability that AK1 has taken. AK1 deploys its organizational resources in support of sustainability while AK2 does not. For instance, AK1 demonstrates through its inclusion of sustainability in adopted plans, policies, and measures as well as its work processes, a commitment to sustainability efforts. For example, AK1's adopted plans that include provisions supporting sustainability include: comprehensive plan, climate action plan, and comprehensive economic strategy. In addition, the annual budget includes line items funding sustainability efforts. In contrast, AK2's comprehensive plan, hazards mitigation plan, and adopted budget do not have any comparable level of support or mention of measures in support of sustainability. The lack of mention of sustainability suggests that AK2's policy makers have determined that sustainability efforts are not a priority for the city.

The difference in formal and informal measures taken by the two cities also offers clues as to why one pursues sustainability while the other does not. Formal measures are those that receive consideration and approval of the governing body. In the case of plans and budgets, the governing body adopts such measures by ordinance giving them the force of law. As such, formal measures strengthen city endeavors by: 1) providing legal and financial authority for action, 2) making the endeavors less subject to change, 3) making the endeavor a higher organizational priority for action, and 4) providing policy guidance and goal setting to the workforce. In other words, as the planning and budgetary actions in support of sustainability were taken by AK1's governing body, they considered and approved them, it represents formal adoption methods and thus a strong policy framework in support of sustainability.

In addition, the formal adoption of measures in support of sustainability allows, actually may require, the development and use of informal measures, such as work rules and internal organizational policies that seek to accomplish the goals of formal measures. Informal measures include those actions such as policies and procedures that are more easily changed. For example, a purchasing officer may establish "green" purchasing policies that encourage environmentally safe products but a new purchasing officer may change the policy at his or her discretion since the policy is not required or supported by a mandate from the governing body. In AK1's case, examples of informal measures include the employee orientation manual which informs new employees about the city's sustainability efforts and the completion of a building energy audit that identifies methods of reducing energy consumption and generation of greenhouse gas emissions and a revolving loan fund to implement energy efficiency projects.

The cities differ in their form of government, manager (AK1) and mayor (AK2). AK1's actions support Teodoro's (2009) finding that the manager form of governing is more disposed towards sustainability. However, the manager of AK1 mentioned during the interview that sustainability had been his mayor's "idea." Thus, it is quite possible that the real indicator for interest in sustainability has nothing to do with the manager or mayor form of government indeed, it probably lies somewhere else. Instead, the locus of attention should be placed on the willingness of the governing body to agree to sustainability efforts because, after all, it is the governing body that controls the adoption of ordinances, policies, and funding of programs in both forms of government.

The natural environment, more specifically extreme weather events, also appears to be associated with city pursuit of sustainability. For the two cities considered in the study, only AK1 has a history of extreme weather events (e.g., flooding) and a higher potential vulnerability to climate change (e.g., coastal erosion, sea level rise, and storm surges). These histories and vulnerabilities may heighten the interest of city government and members of the community to take actions to mitigate risk and damage. Hence, the natural environment may create conditions that make AK1 more pre-disposed toward sustainability as a means of coping with extreme weather and natural disasters.

The study did not yield any strong findings for last variable category considered, polycentric collaboration. The lack of senior level mandates on planning and sustainability measures minimizes the need for each city to collaborate with the state and federal governments on such matters. Without any state or federal mandate, it is left to the cities to make their own decision which may make the existence of community organizations more important. The study did find that AK1 undertook some collaborative efforts and that it had a community-based sustainability non-governmental organization to work with.

Lastly, the results discussed here are for two cities having populations of less than 15,000 each. Yet the vast majority of previous research has focused on urban areas with populations exceeding 50,000 with most above the 100,000 population level. It may be that smaller cities behave differently.

A1.3 Conclusion

The study's findings show support for some of the literature findings, e.g., income levels, while in other cases does not, e.g., voting patterns. In other cases, the results contradicted the previous studies such as population change and percent of population in manufacturing

occupations. The study also suggests that each variable category influences the others and that the conditions of each category must reach a certain tipping point in order for efforts on sustainability to progress. The study also identified adjustments and refinements to the research methods and data collection procedures that should take place to enhance investigatory power.

A1.4 Future research

The pilot study provided suggestions for several refinements to our ongoing research that may enhance our understanding of local government pursuit of sustainability. One refinement is to explore the linkages, if any, between resiliency and sustainability. For example, communities that have invested in disaster resilience may be more likely to pursue sustainability since sustainable practices strengthen a community's ability to absorb a shock, e.g., extreme weather event, and continue to function as before. Local governments play a major role in disaster mitigation through emergency response and hazard mitigation plans and infrastructure improvements. A major way of mitigating disaster is to reduce exposure (vulnerability) to such events in the first place. Sustainability provides a means of reducing vulnerability by diversifying a community's economy, housing, energy and food sources to name only a few. Thus, if a local government has strong hazard mitigation efforts then it may help predict the pursuit of sustainability. Investing in disaster resiliency is also an acknowledgement, or perhaps awareness, that our climate is changing and therefore may indicate support for sustainability efforts.

Another refinement is to consider in more depth the possible role a community's employment in the arts, entertainment, accommodations, management, and self-employment in relation to a local government's pursuit of sustainability. This potential explanation is related to the high role such occupations have with generating innovation as described by the notion of a "creative class" (Florida, 2002). Since sustainability is an innovation, it is possible that the higher proportion of those employed in creative class occupations, the higher likelihood of community support (demand?) for sustainability. The U.S. Department of Agriculture (2013) has studied the role of the creative class and provides evidence that certain rural areas of the United States are also centers of innovation due to their high proportion of creative class attributes. Future research will therefore consider the role, if any, of the creative class and pursuit of local government sustainability.

During the course of the study, variables other than those identified in the literature as related to municipal pursuit of sustainability appear to offer explanatory promise as shown in

Table A1.13. These variables are within the category, Community Context, and include: commute time, housing type and value, and home heating costs/fuel type. For instance, energy costs have direct effects on household expenditures and may therefore influence a community's perception of the wisdom of sustainability especially regarding energy efficiency. Low housing tenure may provide indicators of community cohesiveness and may drive community-wide perception of sustainability one way or another. Also, a high proportion of high value homes may suggest the existence of wealthy opinion leaders that may or may not consider sustainability important. The refinements will thus include an analysis of other demographic variables as a means of enhancing explanation of municipal sustainability efforts.

Table A1.13. Demographic Data

Category	AK1	AK2
Population		
Residency: 1999 or earlier	43.8%	26.9%
Income		
Below 100 percent of the poverty level (2009 data)	11.7%	12.7%
Households with Food Stamps/SNAP benefits	7.6%	13.8%
Households without Health Insurance Coverage	Unreported	Unreported
Travel		
Mean travel time to work (in minutes)	13.7	29.6
Car, truck, or van -- drove alone	71.8%	69.6%
Car, truck, or van – carpooled	4.3%	17.2%
Public transportation (excluding taxicab)	1.1%	1.1%
Walked	7.4%	1.5%
Other means	6.6%	5.7%
Worked at home	8.8%	4.9%
Industry		
Ag, forestry, fishing, hunting & mining	8.1%	4.8%
Construction	7.3%	13.1%
Manufacturing	3.2%	1.7%
Arts, entertainment, recreation, accommodation, & food service	12.0%	4.6%
Public administration	5.0%	11.0%
Class of worker		
Private wage & salary	67.5%	71.0%
Government	14.9%	23.0%
Self-employed, own not incorporated business	17.3%	5.7%
Unpaid family	0.3%	0.3%
Housing		
Total Housing Units	2,684	3,380
1-unit, detached	71.0%	52.4%
1-unit, attached	1.0%	4.3%
2+ units	22.6%	40.0%
Mobile home	5.1%	3.3%
Boat, RV, van, etc.	0.3%	0%
Home heating fuel		
Utility gas	1.3%	88.3%
Bottled, tank, or LP gas	14.8%	0.1%
Electricity	11.1%	6.4%
Fuel oil, kerosene, etc.	66.1%	4.1%
Coal or coke	0.5%	0.0%
Wood	4.2%	0.6%
Solar energy	0.0%	0.0%
Other fuel	2.0%	0.4%
Value of Structure		
Less than $50,000	3.5%	1.1%
$50,000 to $99,999	2.8%	3.9%
$100,000 to $149,000	4.3%	9.4%
$150,000 to $199,000	19.5%	25.8%
$200,000 to $299,000	33.2%	42.1%
$300,000 to $499,000	27.0%	15.7%
$500,000 to $999,999	9.1%	1.6%

Source: U.S. Census Bureau (2011).

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Appendix –A1
Trial scorecard

Scoring Levels – Formal Adoption Methods

Score	Adoption Method
0	No mention in adopted ordinances, resolutions, polices, plans
1	Some mention in adopted ordinances, resolutions, policies, or plans.
2	General narrative in 1-2 adopted documents, plan exists.
3	General narrative in 1-2 adopted documents, adopted plan.
4	Detailed narratives in >2 adopted documents, adopted plan.

Informal Adoption Methods

Score	Method
0	No mention in executive directives, polices, o plan.
1	Some mention in executive directives, policies, o plan.
2	General narrative in 1-2 executive directive(s), policy (ies); o plan.
3	General narrative in 1-2 executive directives, policy; on-adopted plan.
4	Detailed narrative(s) in >2 executive directives, policies; on-adopted plan.

Pillars of Sustainability

Score	3 Pillars of Sustainability
0	None addressed
1	1 Pillar addressed
2	2 Pillars addressed
3	3 Pillars addressed
4	Explicit narrative regarding 3 Pillars

Implementation Effort

Score	Level of Effort
0	No implementation
1	Less than 33% of goals/practices implemented
2	Between 34% and 66% of goals/practices implemented
3	More than 67% of goals/practices implemented

Monitoring Effort

Score	Level of Effort
0	No benchmarks, indicators, or targets
1	Less than 33% of goals/practices monitored
2	Between 34% and 66% of goals/practices monitored
3	More than 67% of goals/practices monitored

Number of Categories Addressed (see categories, below)

Score	Number of categories
0	one
1	1-4
2	5-9
3	10+

Sustainability Focus Areas

Focus Area
Air quality
Climate
Hazard mitigation
Stream/lake/drinking water quality
Economic diversity
Building design (e.g., LEED)
Affordable housing
Environmental Purchasing Procedures/Policies, Green Purchasing
Energy
Livable wages
Smart growth, infill development
Natural environment, land use, open space, Ag land preservation.
Transportation
Food security
Waste management
Community & public participation, public engagement
Cultural and historic preservation
Diversity
Innovation

Budgetary and Personnel Support, Innovation

Score	Budget/Personnel
0	One
3	Specific budgetary support
3	Dedicated personnel
3	Innovative, unique practice(s)

7-A dummy variable, 0 for no community-based sustainability organization in area, 1 for yes.
8-Evidence of regular collaboration with other agencies on sustainability and/or resource management matters.
9A dummy variable, 0 for no evidence of use of sustainability best practices and 1 for yes.

Scorecard 2
STAR Rating Method

This section is taken verbatim from the STARS (Sustainability Tracking Assessment & Rating System) Version 1.1 Technical Manual, September, 2011 by the Association for the Advancement of Sustainability in Higher Education.

How Credits Were Developed and Weighted STARS credits were developed in large part by reviewing campus sustainability assessments, sustainability reports from businesses, and other sustainability rating and ranking systems. As detailed in the previous section, the initial credits were revised or eliminated and new credits were added based on feedback from hundreds of diverse stakeholders and experts. In addition, STARS credits were vetted using four criteria.

First, in order to be included, each credit must lead to improved environmental, social, and/or economic performance by colleges and universities. While the sphere of impact may vary—for example, colleges and universities can accelerate the transition to renewable energy systems by installing technologies on campus, investing endowment funds in renewable energy companies, advocating for public policies that support renewable energy, teaching students about renewable energy in and out of the classroom, and/or conducting research on new technologies—each credit should indicate a movement toward sustainability.

Second, given the diversity of higher education institutions, each STARS credit should be appropriate for most institution types. In order to accommodate this diversity, some STARS credits do not include detailed specifications but are instead flexible or open. In other cases, credits include an applicability criterion, so that the credit only applies to certain types of institutions. By following this approach, institutions are not penalized when they do not earn credits that they could not possibly earn due to their circumstances.

Third, STARS strives to prioritize performance over strategy when possible. Performance credits are based on measurements of sustainability performance, typically quantitative, such as the percentage of employees who use alternative modes of transportation to get to and from campus. Strategy credits focus on approaches or processes that can help improve an institution's performance, such as offering transit passes or operating a campus shuttle service. There are often different strategies or approaches an institution can take to achieve the same outcome. While both types of credits provide useful information, the primary goal of the system is to catalyze tangible improvements, not simply to encourage adoption of more strategies. In many instances, however, measurable, meaningful, and fairly comparable performance indicators could not be identified, so a strategy-based credit was used. And in some cases, strategy indicators tell a richer story about an institution's sustainability initiatives and provide valuable information worth collecting and sharing. As a result, both strategy and performance
credits have a place in the system.

Finally, to help ensure that the system works as intended, AASHE strived to ensure that each credit was objective, measurable, and actionable. As these questions indicate, the focus in allocating points was on the *impact, n*ot the *difficulty*, of earning the credit. Some sustainability initiatives may be very difficult to implement but yield negligible impacts. Conversely, some generally easier projects have significant impacts. Assigning points based on the difficulty of

earning a credit would create a perverse incentive for institutions to focus on the difficult projects or initiatives, which may not have the most meaningful impact.
Additionally, STARS is designed to incorporate the full spectrum of sustainability achievement, and upper levels of achievement represent highly ambitious, long-term goals. Therefore there are some points that few, if any, institutions would achieve currently.

Scoring and Ratings Only positive ratings are available through STARS—each rating level represents significant sustainability leadership. Participating in STARS, which includes gathering extensive data and sharing it publicly, represents a commitment to sustainability that should be applauded. There are five levels of STARS Ratings available: Bronze, Silver, Gold, Platinum, and Reporter. The table on the following page summarizes the scoring thresholds corresponding with each rating level.

An institution's STARS score is based on the average of the percentage of applicable points it earns in each of the three categories. For example, if an institution earned 2o percent of applicable points in the Education and Research category; 3o percent of applicable points in the Planning, Administration & Engagement category; and 4o percent in the Operations category, the institution's overall score would be 3o (the average of the three percentages).

Understanding Sustainability The concept of sustainability has shaped the development of STARS and is fundamental to the rating system. While sustainability has become increasingly popular, both on campus and in society at large, its history and meaning are sometimes misunderstood.

One of the most popular definitions of sustainability is actually a definition of sustainable development. It is from *Our Common Future: The Report of the World Commission on Environment and Development*, commonly known as the Brundtland Commission Report:

> 1. Sustainable development is development that meets the needs of the present without
> compromising the ability of future generations to meet their own needs. It contains within it two key concepts:
> --- the concept of 'needs', in particular the essential needs of the world's poor, to which
> overriding priority should be given; and
> --- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.
>
> 2. Thus the goals of economic and social development must be defined in terms of sustainability in all countries [...]
>
> 3. [...] Physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow option of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation.

The interconnectedness and interdependence of the social, environmental, and economic components of sustainability are included throughout *Our Common Future*. The Brundtland Commission writes, "Our inability to promote the common interest in sustainable development is often a product of the relative neglect of economic and social justice." The report continues, "A world in which poverty and inequity are endemic will always be prone to ecological and other crises. Sustainable development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life."

To further advance the principles of sustainability, the Brundtland Commission called for a "universal declaration" of norms to promote sustainable development. This goal was realized with the Earth Charter, a "global consensus statement on ethics and values for a sustainable future." Developed over a period of ten years with extensive global consultation, the Earth Charter has been formally endorsed by many organizations. The Earth Charter continues the Brundtland Commission's understanding of the connections between social justice, environmental welfare, and economic security. Today, most uses of and references to sustainability emphasize the concept's simultaneous economic, environmental, and social dimensions. For example, businesses talk about the triple bottom line: people, planet, and profits (or, alternately, human capital, natural capital, and financial capital). Likewise, sustainability educators commonly refer to the Three E's of sustainability: economy, ecology, and equity.

Popular representations of sustainability also underscore the concept's three dimensions. Sustainability experts often use a three-legged stool as a symbol for sustainability. The social, economic, and environmental components each represent one of the stool's legs. If one of the legs is missing, the sustainability stool can't balance or function. Another common illustration of sustainability is the diagram at left depicting three overlapping circles representing environmental needs, economic needs, and social needs. The area where the circles overlap and all three needs are met is the area of sustainability.

This understanding of the three interdependent dimensions of sustainability is consistent with sustainability rating systems for businesses, including the Dow Jones Sustainability Index and SBAR (Sustainable Business Achievement Rating System). STARS attempts to translate this broad and inclusive view of sustainability to measurable objectives at the campus level. Thus, it includes credits related to an institution's environmental, social, and economic performance.

Appendix 2 Questionnaire for Selecting Oregon Sites

Expert Panel Questionnaire

This research seeks to further understanding of why some local governments pursue sustainability efforts while others do not. The study is being conducted as part of dissertation research and seeks information from local governments in Alaska and Oregon.

Individual responses are confidential and anonymous and you may decline to participate at any time. The survey will take about 15 minutes to complete. If you have any questions, please do not hesitate to contact John Duffy at jduffy@alaska.edu or 907-830-7307. Thank you for participating.

The following table lists Oregon cities and counties having a population between 10,000 and 50,000. Based on your professional judgment and experience, select the appropriate response to indicate if the city or county is pursuing sustainability efforts.

A city or county pursuing sustainability typically states that they are doing so through a planning document, resolution, etc., and takes action to achieve it. See page 3 for common local government actions.

For each city and county listed below, select the appropriate response that best completes the following phrase:

To the best of my knowledge, city/county...	is pursuing sustainability efforts	is not pursuing sustainability efforts	Unsure/Don't Know
Ashland city			
Canby city			
Central Point city			
Coos Bay city			
Cornelius city			
Dallas city			
Damascus city			
Forest Grove city			
Gladstone city			
Grants Pass city			
Happy Valley city			
Herniston city			
Keizer city			
Klamath Falls city			
La Grande city			
Lake Oswego city			
Lebanon city			
McMinnville city			
Milwaukie city			
Newberg city			
Newport city			
Ontario city			

To the best of my knowledge, city/county...	is pursuing sustainability efforts	is not pursuing sustainability efforts	Unsure/Don't Know
Oregon City, city			
Pendleton city			
Redmond city			
Roseburg city			
St. Helens city			
Sherwood city			
The Dalles city			
Tigard city			
Troutdale city			
Tualatin city			
West Linn city			
Wilsonville city			
Woodburn city			
Baker county			
Clatsop county			
Columbia county			
Crook county			
Curry county			
Hood River county			
Jefferson county			
Lincoln county			
Malheur county			
Morrow county			
Tillamook county			
Union county			
Wasco county			

Some of the more common local government sustainability actions may involve any of the following activities:

- completed energy audits,
- uses environmental purchasing procedures,
- developed a climate change action plan,
- uses energy efficient/sustainable building design standards,
- sustainability included in the comprehensive plan,
- affordable housing efforts,
- renewable energy programs/projects,
- sustainable economic development plans/actions,
- pre-cautionary hazards mitigation related to climate change,
- water conservation planning, practices, and infrastructure,
- recycling,
- waste reduction projects,
- food security planning,

- community gardens,
- farmer's market sponsorships,
- ecosystem management,
- watershed management,
- natural hazards / sensitive land mapping (e.g., steep slopes, wetlands, flood zones, earthquake faults)
- reclamation / reuse of treated wastewater,
- smart growth development/zoning codes,
- on-site water management,
- green infrastructure projects,
- traffic management/design such as use of roundabouts, traffic calming,
- carpooling/vanpooling sponsorship, etc

Appendix 3 Online Survey

Note: The survey shown here was sent to local governments with a manager form of government. A similar survey was sent to local governments with a mayoral form government; however, pertinent changes were made. For instance, membership in the Conference of Mayors was substituted for membership in the International City/County Managers Association.

Survey Questions

The purpose of this research is to help understand the practice of sustainability by local governments and it is being conducted as part of dissertation research. The research project is collecting information from local governments in Alaska and Oregon. The project is not funded or supported by any federal, state, or local agency. At no time will you be asked to purchase anything or contribute any money.

Individual responses are strictly confidential and anonymous. The survey will take about 20 minutes to complete. Begin by placing the cursor in the box of Question 1 and use the tab key or mouse to move to the next question. Once you have completed the survey, place the cursor on the "SUBMIT" button and press "ENTER" or "click the mouse." To reset your responses to the entire form, place the cursor on the "RESET" button found on the last page and press "ENTER" or "click the mouse." If you have any questions, please do not hesitate to contact John Duffy at jduffy@alaska.edu or 907-830-7307. Thank you for participating in this important research.

1. Is the municipality a member of International City/County Manager's Association? Yes No
2. Is the municipality a member of International Council for Local Environmental Initiatives? Yes No
3. Is the municipality a member of the Alaska Municipal League? Yes No
4. Does the municipality have a unionized workforce? Yes No
5. Has the municipality implemented a specialized, organization-wide management enhancement program? Please mark all that apply: Bainbridge Six Sigma, Lean

   High Performance Organization (HPO) Total Quality Management (TQM)

   Training Within Industry (TWI) Self-developed program

   No management program implemented

a. If so, what year was the program implemented?

6. What is the total number of municipal employees (full-time equivalents)?

7. How many years have you worked in your present position? years.

8. Was your previous employment position in local government? Yes No

9. Please indicate any professional certifications and academic degrees that you hold, if any.

Professional certification(s): (a) , (b)

Undergraduate degree(s): (a) , (b)

Graduate degree(s): (a) , (b)

10. Please describe your professional background with 5+ years experience (mark all that apply):

Planning	Budget/Finance	Administrative/Management
Military	Legal	Emergency Services
Education	Business/Private Sector	Non-Profit/NGO

Other (please describe):

11. Please indicate the total number of positions within the municipality having the rank of:

Assistant/deputy manager: Department director:

Municipal clerk/deputy clerk: Municipal/assistant attorney:

a. Of the positions identified above, how many were hired or promoted from within the organization?

b. How long has each of the present occupants of the positions noted below held the position?

Assistant/deputy manager:	years	Department director -#1:	years
Department director -#2:	years	Department director -#3:	years
Department director-#4:	years	Department director -#5:	years
Municipal clerk:	years	Municipal attorney:	years

12. Has the municipality reviewed all of its policies and procedures in the last 3 years? Yes No

13. How many new policies and procedures has the municipality adopted in the last 3 years, if any?

14. How many new policies and procedures, has the municipality adopted in the last three years that affect energy efficiency, if any?

15. How many new policies and procedures has the municipality adopted in the last three years that affect sustainability programs or practices, if any?

16. Does the municipality have personnel trained in the field of sustainability? Yes No

17. Does the municipality's budget contain funds for sustainability activities/programs? Yes No

18. Is there a citizen's based group, NGO, and/or business group that is actively involved in the community's sustainability efforts? Yes No

a. If so, please name the group(s):

19. Does a taxpayer group/association exist in the community? Yes No

b. If so, how active is it?

Very active Somewhat Active Average A Little Active Not Active

20. Does a limited government group/association exist in the community? Yes No

c. If so, how active is it?

Very active Somewhat Active Average A Little Active Not Active

21. Does an environmental group/association exist in the community? Yes No

d. If so, how active is it?

Very active Somewhat Active Average A Little Active Not Active

22. Has the municipality implemented any energy efficiency efforts over the last 10 years? Yes No

23. Has the municipality adopted a sustainability plan? Yes No

24. Has the municipality adopted an ordinance implementing a sustainability program/practice? Yes No

If you marked yes to question #24, please go to question #26

25. If you wanted to implement sustainability programs and/or practices but could not, please describe the barriers, if any, that you believe exist at your municipality. Check all that apply.

Not needed	Other priorities more important	Lack of funding
Lack of personnel	Lack of time	Council not interested
Community not interested		Tried before and didn't work

Unsure of how to go about designing a sustainability program or practice

Unsure of how to go about implementing a sustainability program or practice

26. How often does the council meet and discuss sustainability topics, programs, and practices?

Never Rarely Monthly Quarterly Semi-annually Annually

27. How often does the council meet and discuss energy efficiency topics, programs, and practices?

Never Rarely Monthly Quarterly Semi-annually Annually

28. How often does senior management meet and discuss sustainability topics, programs, and practices?

Never Rarely Monthly Quarterly Semi-annually Annually

29. Does the municipality have an adopted comprehensive plan? Yes No

30. Does the municipality have an adopted economic development plan? Yes No

31. Does the municipality presently have a strategic plan? Yes No

32. Does the municipality use any of the following planning practices, check all that apply.

None used Smart Growth New Urbanism Green Infrastructure Green Subdivisions

33. Does the municipality use community, environmental, or sustainability indicators, such as air quality measurements, travel time delay, poverty rate? Yes No

34. Does the municipality have and use a performance measurement system? Yes No

35. Does the municipality have a personnel position dedicated to sustainability practices? Yes No

a. Who does this person report to? (title of position):
b. If there is more than one position dedicated to sustainability efforts please indicate the total number:

36. What departmental unit has the primary responsibility for oversight of the municipality's sustainability efforts?

Public Works Planning Emergency Services Finance Purchasing Mayor's Office Manager's Office Other (please describe)

37. Has the municipality received any local, state, or federal awards in the last 5 years for any of its sustainability programs or projects? Yes No

38. Has the municipality received local, state, or federal awards for its sustainability practices? Yes No

39. What response best describes the governing body's (e.g., council, assembly,) support for energy efficiency efforts.

Very Supportive	Mildly Supportive	Neutral	Mildly Opposed	Very Opposed	Don't Know

40. What response best describes the governing body's (city council, assembly, etc.) support for sustainability programs.

Very Supportive	Mildly Supportive	Neutral	Mildly Opposed	Very Opposed	Don't Know

41. What response best describes citizen interest in the local government's energy efficiency efforts.

Very Supportive	Mildly Supportive	Neutral	Mildly Opposed	Very Opposed	Don't Know

42. What response best describes citizen interest in local government sustainability efforts.

Very Supportive	Mildly Supportive	Neutral	Mildly Opposed	Very Opposed	Don't Know

43. What response best describes senior management's support for energy efficiency efforts.

Very Supportive	Mildly Supportive	Neutral	Mildly Opposed	Very Opposed	Don't Know

44. What response best describes senior management's support for sustainability efforts.

Very Supportive	Mildly Supportive	Neutral	Mildly Opposed	Very Opposed	Don't Know

45. What response best describes the municipal employees support for energy efficiency efforts.

Very Supportive	Mildly Supportive	Neutral	Mildly Opposed	Very Opposed	Don't Know

46. What response best describes the municipal employees support for sustainability efforts.

Very Supportive	Mildly Supportive	Neutral	Mildly Opposed	Very Opposed	Don't Know

47. Has the municipality taken any sustainability actions as pre-cautionary measures to mitigate natural disaster? For example, designing bridge deck heights higher or placing taller piles.
Yes No

Thank you for taking the time to complete the survey. Please place the cursor on the SUBMIT button and press ENTER or "click" the mouse.

Appendix 4 Interview Questions

Interview Questions

Thanks again for taking the time to talk with me. The purpose of this interview is to obtain information about the organization itself, sustainability and energy efficiency efforts, and performance measures and indicators.

Organizational topics

1. Describe how organizational decisions are made (organizational decisions are those that affect the workings of organization; they do not directly influence citizens)
2. Is there a defined role for employees in these organizational decisions? Do they participate? How?
3. How are the organization's priorities determined (organizational priorities are related to the workings of the organization; the priorities do not directly affect citizens)?
   Is there a defined role for employees? Do they participate? How?
4. Does the municipality have any formal environmental justice efforts underway? Is environmental justice a concern?
5. Is there an ongoing effort of collaboration with outside organizations?
   a. other governments (local, state, federal)?
   b. Public health/ hospitals/ health professionals, housing agency, etc.
   c. NGOs, professional organizations, religious organizations, etc.
   d. Private sector, financial, chamber of commerce, etc.
6. Does the municipality pursue innovations and best practices?
   a. Is there a method in place to scan for possible innovations or best practices?
   b. Identify latest innovation.
   c. Who is involved?
7. How often does the council have formal meetings?
8. How often does the council have informal/work session meetings?
9. How often does the council have retreats and/or strategic planning sessions?
10. What are council member backgrounds/professions?

Working with the community.

11. Does the municipality regularly work with the business community on issues related to sustainability matters?
12. Describe the methods (key steps, communication tools, frequency, etc.) the city uses to involve members of the community in major municipal decisions, such as community plans, proposed budgets, bond sales, etc.
13. Does the city have an economic development plan?
14. Does the city have a sustainability and/or energy efficiency plan?
15. Describe the municipality's public participation or community involvement in regards to sustainability efforts?
16. Determine budgetary support or lack thereof. Was funding ever requested for a sustainability project/program? What was response?
17. What funding ever requested for a energy efficiency project/program? What was response?

I'd now like to talk a little about the community's growth and municipal energy efficiency and sustainability efforts.

18. Why has the city gotten involved with sustainability programs and practices?
    Emergency response? Pre-cautionary hazard mitigation? Voter initiative?
    Citizen demand? Governing Board initiative? Manager/mayor initiative?
    Was here when you got here?
19. Are sustainability efforts included within specific operating accounts, such as, landfill operations, water utility operations, etc.?
    a. If so, which operating accounts have such funds?
    b. If so, what are the annual amounts?
20. Are community indicators used to measure sustainability practices? If so, how are they used?
21. Are the performance measures used?
    a. How are they used?
    b. Does the municipality benchmark?
    c. Do they measure sustainability practices?

22. Based on review of any existing sustainability plan, comprehensive plan, strategic plan and economic development plan --- identify items of interest and determine basis for their identification, e.g., an emphasis on livable wages, affordable housing, air quality, etc.
23. Determine the strength, activity level of anti-tax, limited gov't, and environmental groups. How do they make their voices known? Frequency of activity/involvement?

I've a few questions about extreme weather events, natural disasters, and environmental issues

24. Has the city/county responded to an extreme weather event in the recent past (5 years or so)? If so, what was it and what happened?
25. Is the city/county working on ways of addressing extreme weather events? If so, how?
26. What types of disasters have occurred in last 5 years? Note both human-caused and natural

    Any changes due to the disaster? Any municipal mitigation measures?

27. Does the municipality have any environmental challenges that you are aware of?

    Drought, flooding, drinking water supply, Superfund sites, ETC.

That concludes my questions; do you have anything to add?

Thank you again for taking the time to complete this interview, it is very much appreciated. Once I've completed the data collection and develop a draft a report I will be sending it to you for your review and comment.

Appendix 5
Scorecard Calculation Criteria
Scorecard Number 1

Scoring Levels – Formal Adoption Methods

Score	Adoption Method
0	No mention in adopted ordinances, resolutions, polices, plans
1	Some mention in adopted ordinances, resolutions, policies, or plans.
2	General narrative in 1-2 adopted documents, plan exists.
3	General narrative in 1-2 adopted documents, adopted plan.
4	Detailed narratives in >2 adopted documents, adopted plan.

Informal Adoption Methods

Score	Method
0	No mention in executive directives, polices, or plan.
1	Some mention in executive directives, policies, or plan.
2	General narrative in 1-2 executive directive(s), policy (ies); or plan.
3	General narrative in 1-2 executive directives, policy; an-adopted plan.
4	Detailed narrative(s) in >2 executive directives, policies; on-adopted plan.

Pillars of Sustainability

Score	3 Pillars of Sustainability
0	None addressed
1	1 Pillar addressed
2	2 Pillars addressed
3	3 Pillars addressed
4	Explicit narrative regarding 5 Pillars

Implementation Effort

Score	Level of Effort
0	No implementation
1	Less than 33% of goals/practices implemented
2	Between 34% and 66% of goals/practices implemented
3	More than 67% of goals/practices implemented

Monitoring Effort

Score	Level of Effort
0	No benchmarks, indicators, or targets
1	Less than 33% of goals/practices monitored
2	Between 34% and 66% of goals/practices monitored
3	More than 67% of goals/practices monitored

Number of Categories Addressed (see categories, below)

Score	Number of categories
0	None
1	1-4
2	5-9
3	10+

Sustainability Focus Areas

Focus Area
Air quality
Climate
Hazard mitigation
Stream/lake/drinking water quality
Economic diversity
Building design (e.g., LEED)
Affordable housing
Environmental Purchasing Procedures/Policies, Green Purchasing
Energy
Livable wages
Smart growth, infill development
Natural environment, land use, open space, Ag land preservation.
Transportation
Food security
Waste management
Community & public participation, public engagement
Cultural and historic preservation
Diversity
Innovation

Budgetary and Personnel Support, Innovation

Score	Budget/Personnel
0	None
3	Specific budgetary support
3	Dedicated personnel
3	Innovative, unique practice(s)

Sustainability Organization

Score	Community-based sustainability organization exists?
0	No
1	Yes

Collaborative Efforts

Score	Collaborative meetings
0	None/rare
1	Once every six months or more
2	Monthly

Use of sustainability best practices

Score	Best practices used
0	No
1	Yes

Scorecard Number 2

STAR Rating Method

This section describes the rating criteria of the STARS scorecard (Sustainability Tracking Assessment & Rating System) used in the study. The criteria is adapted from the STAR rating criteria presented in the Technical Manuals, versions 0.5 (September, 2008) and 1.1 (September 2011) as developed by the Association for the Advancement of Sustainability in Higher Education.

Internal Recycling Program
Criteria
A basic recycling program; a means for recycling bottles, cans, paper, and cardboard is operational. There are designated and clearly labeled recycling receptacles for all local government buildings.

- 0 points = No internal recycling program
- 1 point = Internal recycling program is operational

External (community) Recycling Program
Criteria
A basic recycling program for the community providing the means for recycling bottles, cans, paper, and cardboard is operational. There are designated and clearly labeled recycling receptacles for all local government buildings.

- 0 points = No internal recycling program
- 1 point = Internal recycling program is operational

New Construction, Renovations, and Commercial Interiors
Criteria
New buildings, major renovations, and interior improvements meet Leadership in Energy and Environmental Design (LEED) standards for New Construction, Core & Shell, or Commercial Interiors.

- 0 = New buildings are not required to meet LEED standards.
- 1 = All new buildings, major renovations, and interior improvements meet LEED certification criteria (at any level).
- 2 = All new buildings, major renovations, and interior improvements meet LEED Silver or higher certification criteria and at least 25 percent of new building square footage is certified LEED Silver or higher.
- 3= All new buildings, major renovations, and interior improvements meet LEED Gold or higher certification criteria and at least 25 percent of new building square footage is certified LEED Gold or higher.
- 4 = All new buildings, major renovations, and interior improvements meet LEED Platinum certification criteria, and at least 25 percent of new building square footage is certified LEED Platinum.

Building Operations and Maintenance
Criteria
A specified percentage of the institution's eligible buildings meet the certification criteria outlined in the LEED for Existing Buildings (LEED-EB) certification system and/or are certified under the LEED-EB system.

- 0 = New buildings are not required to meet LEED-EB standards.
- 1 = Any portion of the institution's buildings are LEED-EB certified (at any level).
- 2 = At least 10 percent of the institution's building square footage is LEED-EB certified (at any level) and at least another 40 percent of the institution's building square footage meets the criteria for LEED-EB certification (at any level).
  Continued --
- 3 = At least 15 percent of the institution's building square footage is certified LEED-EB Silver or higher and at least another 60 percent of the institution's building square footage meets the criteria for LEED-EB Silver or higher certification.
- 4 = At least 20 percent of the institution's building square footage is certified LEED-EB at the Gold level or higher and at least another 70 percent of the institution's building square footage meets the criteria for LEED-EB Gold or higher certification.
- 5 = At least 20 percent of the institution's building square footage is LEED-EB Platinum certified, and at least another 75 percent of the institution's building square footage meets the criteria for LEED-EB Platinum certification.

Greenhouse Gas Emissions Inventory
Criteria
Institution has completed an inventory and analysis of greenhouse gas (GHG) emissions for all local government buildings.

- 0 = No inventory and analysis completed
- 1 = Inventory and analysis completed

Greenhouse Gas Emissions Reduction
Criteria
Institution achieved specified net reductions in its greenhouse gas (GHG) emissions based on its inventory and analysis. For this credit, purchasing carbon offsets that have been verified by a third party may count towards a portion of the reduction.

- 1 = Institution reduced GHG emissions by at least 5 percent, or purchased carbon offsets to achieve a net reduction of at least 50 percent.
- 2 = Institution reduced GHG emissions by at least 20 percent, or purchased carbon offsets to achieve a net reduction of 100 percent.
- 3 = Institution reduced GHG emissions by at least 40 percent.
- 4 = Institution reduced GHG emissions by at least 65 percent.
- 5 = Institution reduced GHG emissions by 100 percent (carbon neutrality), with carbon offsets comprising no more than 15 percent of the reduction.

Building Energy Consumption
Criteria
Institution has completed energy audits of local government facilities. Retrofitting and replacement with energy efficient components have been completed.

- 0 = No energy audits completed
- 1 = Energy audits completed for all local government buildings
- 2 = Energy audits completed and retrofitting/replacement underway or completed

Renewable Energy Use
Criteria
Local government is using renewable energy sources for its buildings

- 0 = No renewable energy sources used
- 1 = Some local government buildings use renewable energy sources
- 2 = All local government buildings use renewable energy sources
- +1 = Local government has ordinance(s) addressing use and standards for private use of renewable energy sources, e.g., wind generation tower standards, solar envelopes, etc.

Environmental Purchasing Program
Criteria
Institution purchases environmentally preferable products, e.g., cleaning products, computers, paper, etc. This credit applies to all purchases that the institution has a central mechanism for tracking.

- 0 = No environmental purchasing program in use
- 1 = Environmental purchasing program in place

Municipal Fleet Program
Criteria
Institution has policy to purchase energy efficient vehicles.

- 0 = No energy efficient vehicle purchasing program in use
- 1 = Vehicle energy efficient purchasing program in place

Commute Modal Split
Criteria
A specified percentage of the institution's personnel get to and from their place of work by a means other than single occupancy vehicle for the majority of their daily trips. Alternatives to single-occupancy vehicle transportation include walking, bicycling, van or carpooling, or taking public transportation..

- 0 = No monitoring of employee commuting habits exists
- 1 = More than 25 percent of institution's population primarily uses preferable modes of transportation.
- 2 = More than 50 percent of institution's population primarily uses preferable modes of transportation.
- 3 = More than 95 percent of institution's population primarily uses preferable modes of transportation.

Construction and Demolition Waste Diversion
Criteria
Institution diverts at least 75 percent of its non-hazardous construction and demolition waste from the landfill and/or incinerator. Soil and organic debris from excavating or clearing the site do not count for this credit. The diversion rate is calculated by dividing the weight or volume of materials recycled, donated, or otherwise recovered by the sum of the weight or volume of materials landfilled or incinerated and the weight of materials recycled, donated, or otherwise recovered.

- 0 = No construction and demolition waste diversion program exists
- 1 = Construction and demolition waste diversion program exists

Hazardous Waste Separation and Handling
Criteria
Institution has a comprehensive hazardous waste, waste separation and handling program to safely recycle and disposes of all hazardous materials including paints, oils, electronic products, lighting, chemicals, etc.

- 0 = No hazardous waste separation and handling program exists
- 1 = Hazardous waste separation and handling program exists

Water Conservation
Criteria
The local government has a water conservation program to reduce total water consumption. The program may be internal – only addressing the local government's facilities or may include regulations that address water consumption and conservation throughout the community. The program may address use and installation of low flow components, time of day rules, etc.

- 0 = No water conservation program in place
- 1 = Water conservation program addresses local government buildings/facilities only
- 2 = Water conservation program is community-wide

Stormwater Management
Criteria
Local government has implemented policies and programs to reduce stormwater runoff and resultant water pollution. By decreasing stormwater runoff and treating stormwater on site, institutions can help replenish natural aquifers, reduce erosion impacts, and minimize local water contamination.

- 0 = No stormwater management program exists
- 1 = Stormwater management exists

Strategic Plan
Criteria
Institution's current formally adopted strategic plan or equivalent guiding document includes sustainability at a high level. The strategic plan covers the entire institution. An amendment to the strategic plan may count for this credit, as long as the institution always presents the amendment with the original plan.

- 0 = No strategic plan with high level sustainability statement exists
- 1 = Strategic plan with high level sustainability statement exists

Comprehensive (Master) Plan
Criteria
Institution's current master plan or equivalent guiding document includes sustainability or sustainability-like policies at a high level. An amendment to the comprehensive plan may count for this credit, as long as the institution always presents the amendment with the original plan. Neither a strategic plan nor an independent sustainability plan counts for this credit.

- 0 = Comprehensive plan does not address sustainability in any way
- 1 = Comprehensive plan includes sustainability-like policies that are clearly and separately stated; such as, a policy directed at increasing the number of affordable housing units.
- 2 = Comprehensive plan has clear, specific high level statements regarding sustainability

Sustainability Plan
Criteria
Institution has a sustainability plan that includes measurable goals with corresponding strategies and timeframes to achieve the goals. The plan may be informally used or formally adopted and may address the organization internal operations or the community at large.

- 0 = Sustainability plan does not exist
- 1 = Sustainability plan exists and addresses the internal operations.
- 2 = Sustainability plan exists and addresses the community at large
- +1 = Sustainability plan is formally adopted

Climate Plan
Criteria
Institution has a formal plan to mitigate its greenhouse gas emissions and addresses extreme weather. The plan includes a measurable, numerical goal or goals and a corresponding date or dates by which the institution aims to achieve its goal(s). A formal sustainability plan that includes climate change goals, strategies, and timeframes counts for this credit. The plan may be informally used or formally adopted and may address the organization internal operations or the community at large.

- 0 = Climate plan does not exist
- 1 = Climate plan exists and addresses the internal operations.
- 2 = Climate plan exists and addresses the community at large
- +1 = Climate plan is formally adopted

Sustainability Committee
Criteria
Institution has a standing sustainability committee or other entity that meets at least once per quarter. The committee advises on and/or implements policies and programs related to sustainability. The committee has multi-stakeholder representation, which means its membership includes elected and/or appointed officials, staff, members of the public, and may include other interested parties. The committee may be an informal group or officially appointed by the governing body or local government's administration. A climate change committee meets the criteria for points.

- 0 = No sustainability committee exists
- 1 = Sustainability committee exists

Sustainability Officer

Criteria

Institution has a paid sustainability officer who addresses multiple issues. An employee who focuses on just one issue, such as a diversity officer or alternative transportation coordinator, would not count toward this credit.

- 0 points = No employee specifically charged with sustainability efforts.
- 1 = Any percentage of a paid staff member's time is dedicated to coordinating sustainability initiatives and this responsibility is included in the individual's job description.
- 2 = Institution has a full-time paid sustainability officer.

Sustainability in New Employee Orientation

Criteria

Institution covers sustainability topics in new employee orientation and/or in outreach and guidance materials distributed to new employees.

- 0 = No sustainability topics covered in new employee orientation
- 1 = Sustainability topics covered in new employee orientation

Sustainability Recognition Program

Criteria

Institution has an awards program that recognizes sustainability achievements. Awards and recognition may be granted to individuals, buildings, departments, colleges, or other organizations within the campus community. Awards and recognition are publicized throughout the institution and are granted at least annually.

- 0 = No Sustainability Recognition Program
- 1 = Sustainability Recognition Program in Place